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I. V. Sultanian and A. J. Rhodes

MENTAL HOSPITALS: THEIR SIZE AND FUNCTION
F. S. Lawson

BEHIND THE SCENES IN VIRUS RESEARCH
Thomas M. Rivers

LISTERIOSIS IN THE NEWBORN
John W. Davies, James Parker, Aod McDermott

PSITTACOSIS IN A QUEBEC AVIARY
Paul Genest

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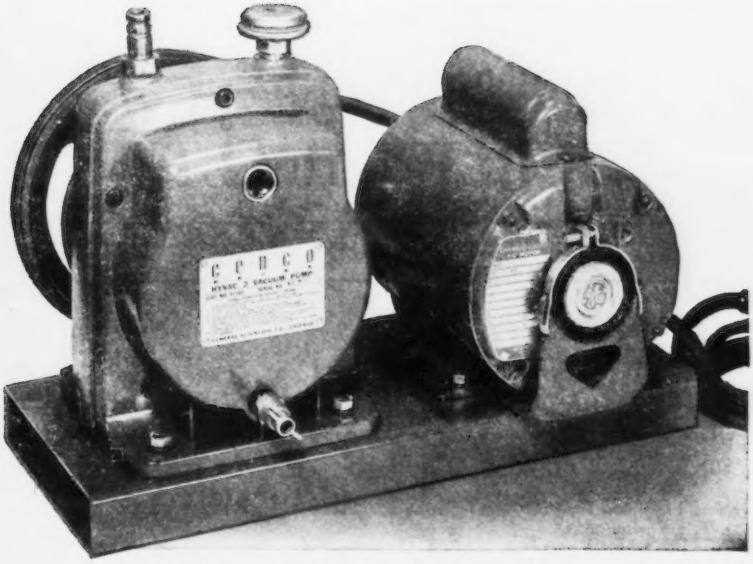

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CONTENTS

ARTICLES:

Isolation of ECHO Virus Type 9 from an Outbreak of Aseptic Meningitis with Rubelliform Rash, Toronto, 1956 181
I. V. Sultanian, B.Sc., M.A. and A. J. Rhodes, M.D., F.R.C.P. (Edin.), F.R.S.C.

Mental Hospitals: Their Size and Function 186
F. S. Lawson, M.D.

Behind the Scenes in Virus Research 196
Thomas M. Rivers, M.D.

Listeriosis in the Newborn 203
John W. Davies, M.B., B.S., D.P.H., James Parker, M.B., B.Ch. and Aod McDermott, M.B., B.Ch., D.P.H.

Psittacosis in a Quebec Aviary 209
Paul Genest, D.M.V., D.Sc.

Vital Statistics in Nova Scotia 211
H. E. Naugler

EDITORIAL SECTION:

The Forty-sixth Annual Meeting 217

The Executive Council of the Canadian Public Health Association 218

ENVIRONMENTAL SANITATION:

Training of Foodhandlers 219
F. Graham, C.S.I.(C)

DEPARTMENTS:

News Notes 221
Books and Reports 224

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Canadian Journal of
PUBLIC HEALTH

VOLUME 49 TORONTO, MAY 1958 NUMBER 5

Isolation of ECHO Virus Type 9 from an Outbreak of Aseptic Meningitis with Rubelliform Rash, Toronto, 1956[1]

I. V. SULTANIAN,[2] B.Sc., M.A.
and
A. J. RHODES,[3] M.D., F.R.C.P. (Edin.), F.R.S.C.

NUMEROUS reports have associated some of the types of ECHO viruses with aseptic meningitis, and their etiologic role in this syndrome is now clearly established (1). Some of the observations have included the following. Duncan and co-workers isolated unidentified ECHO viruses, as yet untyped, from the spinal fluids of two patients in Toronto with aseptic meningitis in 1952 (2). An agent, which was later identified as ECHO virus Type 2, was isolated by Steigman from the spinal cord of a child who died of "polio-like" disease (3). In 1955, Karzon and associates studied a summer epidemic of aseptic meningitis in Holland, N.Y. involving 24 persons (4); ECHO virus Type 6 was isolated from some of these cases. During the same year, another epidemic of aseptic meningitis occurred in western New York and was studied by Winkelstein *et al.* (5). Of the 156 patients studied, 68% excreted ECHO virus Type 6; ten isolations were made from the spinal fluid. During the summer and fall of 1955 in Connecticut, Davis and Melnick, in a study of patients with aseptic meningitis, found that 36% excreted ECHO virus Type 6 (6).

Lately, numerous reports have appeared concerning illness in which ECHO virus Type 9 has been associated with aseptic meningitis with a rubelliform rash (7).

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In a previous paper from our group, Laforest *et al.* gave a clinical account of an epidemic of aseptic meningitis which occurred in Toronto and vicinity in the summer of 1956. The characteristic feature of this outbreak was the appearance of rubelliform rash in 43% of the cases admitted to the Hospital for Sick Children, Toronto. The rash appeared one or two days before the onset of the illness and persisted for about eight days. It covered the face, trunk and the extremities of the patients and did not scale. Recovery was without complication and most of the patients were discharged in about six days (8).

The present paper deals specifically with the laboratory investigation of selected cases in that epidemic. Detailed study was made of the strains of viruses isolated from ten patients who exhibited the characteristic rash.

Methods

Isolation Techniques.

Tissue cultures. Human amnion epithelial cells were grown in bottle cultures in Hanks' balanced salt solution with 0.5% lactalbumen hydrolysate, to which 20% human serum was added. Second generation tube cultures were produced from these bottles in Hanks' balanced salt solution, 0.5% lactalbumen hydrolysate and 20% horse serum. They were maintained in a medium consisting of Earle's balanced salt solution, 0.5% lactalbumen hydrolysate, 0.1% yeast extract and 1% horse serum. Monkey kidney epithelial cells were grown with 2% horse or ox serum and maintained in Earle's balanced salt solution, 0.5% lactalbumin hydrolysate and 0.1% yeast extract (ELY). HeLa cells were grown in 0.1% yeast extract in Hanks' solution to which 15% human serum was added. They were maintained in a medium consisting of ELY medium and medium No. 199 in equal amounts, to which 7.5% rabbit serum was added. To all media, penicillin and streptomycin at a concentration of 250 International Units per ml and 250 micrograms per ml respectively were added. Nutrient media were replenished with fresh at 3 to 4 day intervals.

Isolation of viruses. Tissue culture tubes were inoculated with 0.1 ml of the ultracentrifuged deposit of the stool or 0.2 ml of the cerebro-spinal fluid. The tubes were observed for cytopathogenic changes for seven days. Fluid and cell suspensions from negative tubes were transferred into other tissue culture tubes.

Coverslip technique. Epithelial cell cultures were grown on coverslips and infected with 0.1 ml of virus-containing fluid. After 6, 16 and 24 hours of incubation, the culture fluid was discarded and replaced with fixative. The coverslips were left overnight and then stored in 80% alcohol until stained with hematoxylin and eosin.

Inoculation of suckling mice. Tissue culture fluid containing the virus and representing a fourth passage of the strain in human amnion cells was injected into eight randomized mice of 24 hours of age. Each mouse received 0.03 ml intracerebrally and 0.1 ml subcutaneously. A group of control mice was injected with Hanks' balanced salt solution. The animals were observed over a period of two weeks.

Serology

(*a*) *Patients' sera.* Serial two-fold dilutions of acute and convalescent sera were made in Earle's-lactalbumin-yeast-extract (ELY) medium. The suspension of virus isolated from the patient was diluted so that 0.1 ml would contain approximately 50 CPD_{50}. Equal amounts of virus and serum (0.2 ml of each) were mixed, shaken, incubated for 60 to 90 minutes at room temperature, and 0.1 ml was inoculated into each of two monkey kidney tissue culture tubes. They were observed for cytopathogenic changes over a period of seven days. Titres were expressed as the reciprocal of the highest dilution of serum which inhibited the cytopathogenic effect in both tubes.

(*b*) *Preparation of animal sera.* Antisera against three isolated strains (4, 8, and 11) were prepared in rabbits by the repeated injection of an increasing amount of infected tissue culture fluid which was a fourth passage of that strain in human amnion tissue culture.

(*c*) *Serological identification of isolates.* The standard poliomyelitis and Coxsackie antisera were diluted 1:10 and mixed with an equal quantity of tissue culture fluid containing $100CPD_{50}$ of virus. The mixtures were shaken, incubated for 1 to 2 hours at room temperature, and 0.1 ml was inoculated into each of two tissue culture tubes. They were observed for seven days.

Results

Isolation of viruses in different tissue culture systems. Thirteen viral agents were isolated in human amnion and in two different batches of monkey kidney epithelial cell cultures. Nine of ten stools and four of ten spinal fluids produced cytopathogenic change in the tissue cultures. HeLa cells were not sensitive to the viruses on either first or second passage.

Coverslip cultures. The cytopathogenic changes produced in the epithelial cells were like those of polioviruses except that no cytoplasmic inclusions, as seen in monkey kidney cells, were found. The changes included disappearance of the nucleoli, margination of the chromatin, vacuolation and eventual disappearance of the cytoplasm. No giant cells or cells with intranuclear inclusions were seen in the stained preparations.

Pathogenicity in suckling mice. Signs of flaccid paralysis, especially of the hind legs, were seen on the 5th to 9th day. On histological examination, lesions were found chiefly in the intercostal muscles, and these were characterized by loss of striation and polymorphonuclear infiltration. The liver, the pancreas, the fat pads and the brain were all normal. The controls were healthy and no lesions were seen upon histological examination.

TABLE I

Aseptic Meningitis with Rash
Results of Neutralization Tests, Toronto, 1956

Initials of Patient	Specimen	Interval in Days Between Collection of Acute and Convalescent Sera	Cytopathogenic Changes in Cultures Inoculated with Virus and Following Sera						Titres of Antibody to Homologous Virus**		
			Polio 1, 2, 3 (pooled)	Coxsackie A9, B1–B5 (pooled)	ECHO 3, 5, 6, 7 (pooled)	ECHO 9	Immune Serum Prepared in Rabbits	Human Gamma Globulin	S1*	S2*	S3*
Y.E.	Stool	26	+	+ +	+	—	—	—	4	8	
T.E.	Stool	24	+	+ +	+	—	—	—	32	64	
T.P.	Stool CSF	8	+	+ +	+	—	—	—	2	8	
D.H.	Stool CSF	32, 62	+	+ +	+	—	—	—	2	8	8
D.S.	Stool	24	+	+ +	+	—	—	—	2	8	
D.D.	Stool	No serum	+	+ +	+	—	—	—			
C.L.	CSF	29	+	+ +	+	—	—	—	2	64	
C.A.	Stool CSF	33	+	+ +	+	—	—	—	4	64	
B.B.	Stool	No serum	+	+ +	+	—	—	—			
R.C.	Stool	No serum	+	+ +	+	—	—	—			

*S1 acute phase serum; S2 first convalescent phase serum; S3 second convalescent phase serum.
**Titres are expressed as the reciprocal of the highest dilution of serum.

Patients' sera. The results of the virus neutralization tests are presented in Table 1. It will be seen that antibody response to infection was generally poor, although the convalescent sera of three patients showed titres of 1:64.

Serological identification of the isolates. The results of virus neutralization tests with various antisera are given in Table 1. It will be seen that the strains were not neutralized by pooled antiserum to Types 1, 2, and 3 poliovirus, nor by antisera to the Coxsackie types which are cytopathogenic in tissue cultures, i.e., A9, B1-B5. The strains were, however, neutralized by human gamma globulin at a final dilution of 1:64, and by the antiserum to the ECHO virus Type 9, but not by the pooled antisera to ECHO Types 3, 5, 6, and 7. It is concluded from this test and from the biologic properties of the strains that they are closely related to or identical with ECHO Type 9 virus.

Discussion

Human amnion and two different batches of monkey kidney epithelial cells were employed for the recovery of the viruses from stools and cerebrospinal fluids. The recovery of the same number of antigenically similar agents on each attempted isolation makes it highly unlikely that the isolates were "pick-up" viruses from monkey renal cells (9).

Furthermore, the behaviour of the strains isolated from these cases, in tissue cultures and in suckling mice, coupled with the results of the serologic tests makes it evident that they are members of the ECHO group, and are presumably closely related to or identical with ECHO Type 9. The fact that they are pathogenic to suckling mice increases the difficulty in differentiating them biologically from the Coxsackie group of viruses.

There is as yet no satisfactory explanation for the low titres of virus neutralizing antibodies, even in patients from whom virus was recovered from the cerebrospinal fluid.

The fact that some of the viruses isolated from this outbreak of aseptic meningitis with rubelliform rash were recovered from the spinal fluid, that all strains were antigenically similar, and that neutralizing antibodies developed in the convalescent sera of some of the patients is further evidence that ECHO Type 9 strains are human pathogens and give rise to a specific disease.

Summary

1. Thirteen antigenically similar viruses were isolated in tissue cultures from ten patients during an outbreak of aseptic meningitis with rubelliform rash. Four of these were recovered from the spinal fluids.

2. The agents were readily isolated in human amnion and monkey kidney epithelial cells.

3. Neutralization tests showed that they were antigenically related to ECHO virus Type 9.

4. Unlike the prototype ECHO 9, the isolates were pathogenic to suckling mice, and the lesions produced were similar in many respects to those caused by some of the Coxsackie viruses.

5. Serological studies show that the isolates were poor antigens. The fact that they were neutralized by human gamma globulin and stimulate neutralizing antibody indicates that they infect human beings.

ACKNOWLEDGEMENTS

Appreciation is expressed to Dr. G. A. McNaughton and other physicians on the staff of The Hospital for Sick Children, Toronto, for kindly allowing access to their patients, and to Dr. Mairin Clarke, Miss Norma Davis, and Miss Frances Doane for their helpful advice and kind assistance in many of the tests.

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ALCOHOLISM—A NATIONAL PUBLIC HEALTH PROBLEM

- Alcoholism is an illness that can be treated.
- In Canada there are more than 180,000 alcoholics. Approximately three per cent of those who use alcoholic beverages suffer from alcoholism.
- In 1943 there were 1,240 alcoholics for every 100,000 adult Canadians, and in 1956 the rate increased to 1,850 per 100,000 adults. More new cases of alcoholism are developing in Canada each year than can be treated by all the resources now available.
- The average Canadian alcoholic is a skilled or semi-skilled person between 35 and 45 years of age, married, with two or three children, maintaining his own home, and he is employed.
- In Canada, alcoholic employees lose about 19 working days per year as a result of this illness—more than twice the absenteeism of non-alcoholic employees.
- To date, four provinces have established organizations for the study and treatment of alcoholism—Ontario, Alberta, British Columbia and Manitoba. Saskatchewan has a division of the Department of Social Welfare working in this field.

Alcoholism Research Foundation, Ontario.

Mental Hospitals: Their Size and Function

F. S. LAWSON,[1] M.D.

ANY discussion of mental hospitals is impossible without giving consideration to their function in relation to a total plan for the care of the mentally ill. The older concept of the mental hospital as an asylum where the mentally ill could be stored out of harm's way is no longer acceptable. The mental hospital must be one of the tools used to restore the mentally ill to their place in the community and in the words of Florence Nightingale a hospital must at least "do the sick no harm". We must go further than this in our modern conception of the mental hospital for it must not only do no harm but must actively assist in the patient's cure or rehabilitation. We concur with the late Dr. Kraus' view expressed in a WHO memorandum that "bad mental hospitals are worse than no mental hospitals".

There has been a curious historical sequence during the past century in the "care" provided for the mentally ill. Until early in the 19th century the insane were housed in gaols and were looked upon in the same light as criminals. About mid-century, legislators were prompted by dedicated individuals to produce legislation to ameliorate the lot of the insane. At this time also the "moral treatment of the insane" was introduced—by this was meant the use of humanity and kindliness instead of harsh and brutal treatment.

At the middle of the century Kirkbride and others designed hospitals which allowed privacy and ordinary decent living conditions to accompany the new interpersonal relations between staff and patients. This treatment plan for the mentally ill continued in vogue until the latter 1880's, when, perhaps because of the rapidly developing discoveries of the bacteriological basis of disease, aseptic surgery and emphasis on the organic basis of illness, the psychological aspects were gradually neglected. As Dr. H. Osmond of Weyburn has said in one of his many articles on this topic "the barbarism of the early 19th century was replaced by an insensitive, hygienic, well regulated hopelessness from which, in the better-run hospitals at least, even the cruelty had been leached away by an oppressive impersonality".

This approach during the first half of the 20th century has resulted in an increase in the hospitalized mentally ill to over 72,000 in Canada and is only now beginning to be replaced by newer attitudes. The armamentarium against mental illness, in addition to psychotherapy—group and individual, physical therapies, electrical and surgical and drug therapies of various kinds, now includes milieu therapy which is, under a new name, an expansion of last century's moral treatment to include all the factors in the environment.

[1]Director, Psychiatric Services Branch, Department of Public Health, Regina, Sask.

It has seemed to many psychiatrists that the mental hospital should be an incident in the total treatment program. Whereas formerly the patient who was unacceptable in the community was relegated to life-time incarceration in an asylum, now it is thought the patient should be treated in the community, in out-patient clinics or the home, and the in-patient part of the treatment should only be applied when it is absolutely necessary to the welfare of the patient and should be discontinued when it has served its purpose in relation to the patient's welfare.

In order that the program, including the in-patient segment, may function effectively it is necessary that the hospital be located close to the people which it serves, rather than isolated by distances of even 5 to 10 miles from large centres of population. The hospital should be small enough to avoid the impersonality which always accompanies great size. The structure should allow degrees of privacy and individual preferences similar to those found in homes. It should provide for the possibility of segregation of the patients into small groups, not only from the standpoint of degrees or types of mental affliction but from that of social, educational and aesthetic status and so that interpersonal relations between patients can be maintained.

Disadvantages of the Present Large Monolithic Mental Hospitals

- The policy has resulted in the present population of the mental hospitals in Canada being over 72,000, which number has been increasing at about 2,000 a year. The direct cost to the people of Canada is almost $80,000,000 annually.
- Those patients who are not discharged within 12–24 months tend to remain in hospital indefinitely because the large mental hospital provides a culture of its own to which the patients adapt themselves and reduces the possibility of their re-adaptation to the outside community culture. One may say that the chronic hospitalized mentally ill are produced by the hospital or that chronic mental illness is an iatrogenic condition or, to be more specific, a psychiatrogenic illness.
- The isolation, together with the mystery surrounding the mental hospital, has maintained the stigma historically attached to mental illness. Relatives are not able to visit the patient readily and touch with him is lost. The family tends to regard the patient as dead both because of the difficulty of visiting and the shame implied by the stigma on mental illness.
- The large building containing thousands of patients is productive of impersonality—a quiet unobstrusive patient is easily lost to individual attention and treatment and is only a number on the daily count of his ward.
- Large wards containing up to 100 patients prevent any suggestion of privacy and when there is also, as there is in most hospitals, gross overcrowding, no privacy of person or effects is possible. Toilet and washing facilities have to be used on a mass production line basis, again emphasizing the impersonal atmosphere. Eating facilities suffer from the same production line attitudes, food is often unpalatable and cold.
- Satisfactory interpersonal and social relations have been found to be impossible where groups number over 12 and the optimum size of such groups has been found to be about 7 or 8. Large units render such grouping impossible. Separation into groups suffering from the same type of mental symptoms may be possible in the gross but segregation into groups of the same age or education or personal habits cannot be attained.

We, in Saskatchewan, have been promoting a plan which we believe will not only be more humane but will eventually save millions of dollars because

of more rapid rehabilitation of the mentally ill. This plan has been presented to the provincial government each year for the past three years but has not yet been accepted even in principle. The Cabinet seems to have a feeling that this is a plan which is the brainchild of our local psychiatrists and not accepted elsewhere.

Supporting Opinions Regarding the Disadvantages of Large Mental Hospitals

- WHO Technical report # 73, Third Report of the Expert Committee on Mental Health, published in September, 1953, says in part:

  "In an earlier section it was suggested that many of the failures of mental hospitals have been due to a tendency to model them on the one hand on the general hospital and on the other hand on the prison. Architecturally, the mental hospital often shows the same influences.

  "If the hospital is to become a therapeutic community, as the committee is convinced it must to be successful, it must model its architecture and its plan on that of a community. If it is to support and recreate the sense of individuality in patients, it must not dwarf them by its size and by herding them together in thousands in giant monoblock buildings.

  "Recent studies have suggested that from a point of view of financial economy the optimum capacity for hospitals probably lies between 250 and 400 beds. Smaller establishments are expensive because of their lower average percentage of occupants and the difficulty of amortizing technical equipment which is not in full use. Above 400 beds, the cost per bed begins to increase slowly and reaches rather high figures above 800 beds. The reason is probably uncontrollable wastage, lack of responsibility on the part of too large a staff, unnecessary buying, and an industrial type of mechanization which is inevitable in very large hospitals; one must add to these the impossibility of sustained personal contact between the director and hundreds of hospital workers.

  "In addition, if the mental hospital is near a big general hospital, although its administration, finances, and staff should be entirely independent, it can share the heating plant, laundry, and general stores.

  "It is desirable that the hospital should be composed of a group of small buildings, rather than a single block. The therapeutic community should take the village as its model. Each unit should be planned for a small group of patients preferably about 25–30, and it should be assumed that the majority of patients will sleep, eat, and work in comparatively small groups of up to 10 patients. If economic conditions permit, sleeping accommodation should include a fairly high proportion of separate rooms, and much of the remainder should be in small dormitories for 6–8 patients."

- Dr. W. S. Maclay, Senior Commissioner of the Board of Control in Great Britain, in an address to the Canadian Mental Hospital Institute at Toronto in January, 1958, stated: "We don't want big mental hospitals, but we've got them and have to put up with them but don't let us build any more", and also: "A recent study for WHO by two psychiatrists and an architect, as yet unpublished, recommends a limit of about 300 patients, with ward units of not more than 30 patients suitably sub-divided." Again, "I incline to think that the probability of recovery is greater where a moderate number of persons associate together", and again, "When all the evils of large associations are considered, it is not perhaps too much to attribute to it in degree, the small proportion of cures in some of our larger establishments".
- The Committee on Mental Health Services set up by the Canadian Mental Health Association to study all the aspects of care of the mentally ill in Canada, stated

in an interim report: "The Committee was in favour of hospitals of about 300 beds recognizing that in some larger centres of population the hospitals may be slightly larger but in any case should not exceed 400–500 beds."

- In Denmark a commission was set up in 1952 to study the requirements in that country for mental care. A start has been made on the first stage of the recommended construction. The Danish Medical Bulletin, January 1958, describes this plan as follows:

> "A number of additional general considerations have also been decisive in the drafting of the actual plans. A close union with the general hospital service has thus been considered of prime importance. Psychiatry must, at its present stage of development, necessarily co-operate with the other medical fields, and a close union of the new psychiatric hospitals with the general hospitals is further advantageous by stressing that there is no fundamental difference between mental and physical illness, thus counteracting the widespread discrimination against mental patients.
>
> "It has also been a fundamental principle that the new psychiatric hospitals must be smaller than the existing ones. The ideal size is, of course, open to discussion, but in the opinion of the commission, units of 300–350 beds must be considered a reasonable aim for the time being. Such units are sufficiently large to permit the necessary degree of subdivision into different types of wards, and they will in general have a capacity which will correspond reasonably well to the region served by a regional general hospital (central hospital). The building of more smaller units will also lead to a better contact between the hospital and the population in the region and thereby facilitate out-patient treatment.
>
> "There is, fortunately, a practical possibility of placing most of the new hospitals in close proximity to the regional general hospitals, in some cases to existing ones and in others to newly planned ones. In the latter cases the possibilities of planning the two institutions in such a way that a smooth and economically advantageous co-operation is secured are, of course, particularly good."

- In addition, the Saskatchewan Plan was presented at the American Psychiatric Association Mental Hospital Institute at Denver, Colorado, in October 1956. The plan was generally approved and the only adverse comments had to do with detail and not with the principles involved.

Requirements of an Adequate Plan for the Care of the Mentally Ill

Proper facilities are required for:

- Prevention of serious mental illness by early attention through a clinic service.
- If hospitalization is required, the hospital
  - (i) should not make the patient worse, for instance hospitalization in large groups leads frequently to deterioration instead of improvement.
  - (ii) should contain facilities for adequate specific treatments.
  - (iii) should be situated where it is readily accessible to the patient and to the patient's relatives.
  - (iv) should have facilities for segregation of various types of patients.
  - (v) should provide facilities to produce a milieu which will assist in the patient's recovery—embodying such items as decent human living conditions, privacy, occupational and recreational programs, good food preparation and service, social amenities, etc.
  - (vi) should have sufficient staff to provide personal attention to each patient.
  - (vii) should be small enough that the patient can feel he is a person and not an inanimate object.

As soon as a patient has been hospitalized there should be adequate staff available to prepare the family and the community for the patient's return to his home

and a sufficient number of social workers and medical staff to give supervision of the patient in the community to prevent re-admission to hospital.

The capital and maintenance costs of a plan should not be exorbitant as compared with other methods of providing the same care.

The Saskatchewan Plan

In order to fulfill these requirements in the province, the following plan has been developed:

(i) The province shall be divided into Mental Hospital Regions approximating the present and projected Health Regions of a size to provide a population averaging about 73,000 and a diameter of about 160 miles.

(ii) (a) The equivalent of about four regions surrounding Saskatchewan Hospital, Weyburn, will be considered the Weyburn Mental Hospital area.

(b) The equivalent of about four regions surrounding Saskatchewan Hospital North Battleford, will be considered the North Battleford Mental Hospital area.

(iii) The bed capacity of Saskatchewan Hospital Weyburn and Saskatchewan Hospital North Battleford, shall be reduced to the number of beds indicated by the Federal Construction Grant standards.

(iv) Eight mental hospitals shall be built to serve the eight Mental Hospital Regions.

(v) Each of these eight hospitals shall serve as the focus of the psychiatric care in its region and shall include an out-patient mental health clinic.

(vi) Each hospital shall have:

(a) A central core building with a full basement and ground floor to house laundry, heating plant, stores, kitchen, staff dining-room, business and administrative offices, staff locker rooms, out-patient clinic, chapel, canteen and an occupational and recreational area. This building shall be of a size to allow servicing for 400 patients.

(b) An admission building to house 10 male and 10 female patients, with the necessary examining offices.

(c) An infirmary building to house 10 acutely physically ill male patients and 24 chronically physically ill male patients.

(d) An infirmary building to house 10 acutely physically ill female patients, and 24 chronically physically ill female patients.

(e) As many continued treatment buildings, each housing 30 male or female patients, as appear necessary; the number would vary from 4 to 10 depending on the requirements of the particular Mental Hospital Region.

(vii) Each hospital shall be built in the vicinity of a general hospital so that the operating room and larger X-ray unit do not need to be duplicated. Where it is possible to build the mental hospital on the same grounds as a general hospital, duplication of laundry, heating plant and in some cases, perhaps stores and kitchen facilities, may be avoided.

(viii) Each building housing patients shall be Y-shaped and single storey and shall contain 10–12 patients in each of the three wings accommodated in single, 2-bed and 4-bed rooms or alcoves depending on the standard space requirement for the type of patient. There will be a small day-room space in each wing and a larger day-room at the junction of the 3 wings.

(ix) Within the exterior walls of the patients' buildings it shall be possible to re-arrange the partition walls so that the specific function of the building may be changed from housing continued treatment patients to infirmary or newly admitted patients without interfering with structural components.

(x) There should be additional flexibility provided in building the hospital so that:

(a) The number of patient buildings may be added to according to need and the economic situation in the province.

(b) If the number of younger psychotic patients decreases after buildings have been erected, they may be readily adapted for senile psychotic patients, senile patients or chronically physically ill patients.

(c) If mental illness in both young and old completely disappears, the buildings may be used for old folks' homes.

(xi) A nursing staff/patient ratio of 1:2.34 shall be established in all Regional Mental Hospitals and 1:2.5 in Saskatchewan Hospital Weyburn and Saskatchewan Hospital North Battleford (the lower ratio being made possible by the reduced number of staff needed during the night shift in the larger wards).

(xii) The Munroe Wing, Moose Jaw Psychiatric Ward and present full-time mental health clinics at Regina and Saskatoon and part-time clinics at Swift Current, Yorkton and Prince Albert shall be eventually abandoned.

Use of Psychiatric Wards in General Hospitals

There is some opinion in favour of this plan. It is our opinion that this solution would not be adequate. Some of the disadvantages are:

- It is not a practical solution. The bed requirement is too great. All the psychopathic wards in the country are 30–50 beds in size. They are an integral part of the general hospital. It would be necessary to have 75–80 bed psychopathic wards. Under present arrangements in this province, the space for these wards is leased from the general hospitals at $1.00 a year rental. This would no longer be possible and the extra beds for a large number of people would have to be built. The cost of general hospital additions is over $10,000 per bed while the cost of this additional space in a small mental hospital would be in the neighbourhood of $6,000 a bed.
- The institution of the required number of psychopathic wards would take many years and would tend to accentuate the stigma of the old mental hospitals and make it impossible for them to obtain good staff because the old hospitals would tend to become nothing but chronic custodial institutions again. For years it has been regarded as unwise to have a separation of facilities into active and respectable as opposed to inactive and stigmatized.

- Part-time or full-time mental health clinics would still be needed and expensive space would have to be provided for them, thus increasing the cost.
- There are only 12 general hospitals in Saskatchewan of over 100-bed capacity of which 3 already have psychopathic wards. There are, in addition, 7 general hospitals with a bed capacity of between 70 and 100 which could conceivably accommodate psychopathic wards. Of these 19 hospitals of over 70-bed capacity, 8 are unsuitably located, so that only 11 new psychopathic wards could be established and each would have to have a capacity of over 200 and might better be a Regional Mental Hospital.
- Another objection to the psychiatric wards in general hospitals is that they actually tap a new source of patients from those who would go to mental hospitals and at least 50% of their patients are from this new source. Unfortunately those in control of provincial funds believe that they have solved the problem of caring for the mentally ill after they have established several psychiatric wards when in fact they are merely scratching at the fringe of this enormous problem.
- Another excerpt from WHO report #73 is pertinent in this connection:

> "In much modern writing on the subject it is taken as axiomatic that psychiatric wards in general hospitals are the most desirable form of provision for psychiatric medical care. The committee cannot accept this view as axiomatic. It is true that in a teaching hospital this may be considered the most convenient method of making clinical material available to students; but, as the committee has emphasized, the psychiatric hospital does not do its job best by imitating the general hospital. Too often the psychiatric wards of a general hospital are forced by the expectations of the hospital authorities to conform to a pattern which is harmful to their purpose. Patients are expected to be in bed and nurses are expected to be engaged in activities which resemble general nursing. The satisfactions of neurological diagnosis are enhanced by the prestige in the general hospital of clear-cut physical pathology, to the detriment of interest in the average psychiatric patient whose case does not exhibit such features; and it is difficult to obtain recognition of the overwhelming importance in psychiatry of the factors involving the therapeutic atmosphere.
>
> "Psychiatric wards of general hospitals sometimes have another characteristic which may prove very detrimental to the community mental hospital if they are the only portal of entry for patients into the latter. In such a case the general hospital may treat and return to society a high proportion of psychiatric patients capable of early recovery and send to the community mental hospital only those patients who are grossly disturbed, chronic, or of apparently bad prognosis. There is no more certain way of turning the community mental hospital into a "madhouse" and depriving it of its role of a therapeutic community. It would be wrong to suggest that these problems cannot be avoided, but in order to be avoided they must be recognized, and some of the advocates of psychiatric sections in general hospitals do not seem to be aware of their existence."

Advantages of the Regional Community Mental Hospital

Regional and Community Factors

The regional psychiatric centre will provide continuity of treatment through out-patient care, in-patient care (when required) and rehabilitation. In the community hospital setting, the social worker who sees the patient in his home and the doctor who treats him as an out-patient, will be the same individuals as he will see in the hospital. He will not, as now, be entering an entirely

strange situation in a hospital in which he knows no one. This can be a most important factor in the treatment of a psychiatric patient.

The patients will be cared for close to their homes and their relatives. This will have a two-way effect: the patients will benefit from the support of home and relatives and will become less cut off while in hospital and so will have less ground to regain; the family and relatives will not lose their connection with the patient and will be in a better position to help him to become re-established after his discharge. Social treatment has become a very major factor in psychiatry. It involves working with the patient's family as the family usually has a key part to play in the readjustment. The social psychiatry which is essential to effective treatment cannot be carried out when the hospital is remote from the patient's home.

The stigma presently attached to mental illness is a great barrier to early treatment and an obstacle to the patient's return to community living. The community mental hospital will remove or greatly reduce this stigma because (i) closer proximity of mental patients under treatment will correct community ignorance; (ii) a hospital which is within the community and has close relationships with the community will never develop the stigma of a remote, largely unknown institution; (iii) the mystery associated with the present huge mental hospitals will disappear.

It will be possible in the community hospital to implement the new philosophy and policy in which patients are only sent to hospital, or kept in hospital, when there is something to be gained for the patient. Custodial care will no longer be regarded as a hospital function.

Size of Hospital

The smallness of the community hospital will permit more intimate contact between staff and patients and also between patient and patient. These intimate relationships are essential to effective treatment and they are impossible in the large institution of today.

There will be no long corridors. The long corridors are a dominant feature of almost all large mental hospitals. It has now been learned that they are a definite handicap to the progress of schizophrenic and elderly psychotic patients because they increase the perceptual difficulties of the schizophrenic and the tendency of the elderly psychotic to wander, to become bewildered and often get lost.

The total situation of the community hospital will be a manageable one, to which the patient has a reasonable chance of adjusting. The overwhelming effect of the vast 1,800-bed institution, which is known to make many mental patients worse, will be completely eliminated.

Size of Wards and Groups

The small hospital will permit the patient to live in surroundings which are familiar or nearly so. In contrast to the large wards of the present large mental hospitals, the community hospital will permit the patient to feel that he has a place of his own in which to live and a group of something like family size to which he can become accustomed and feel that he belongs.

The group in which the patients lives will approximate the family group in size with the result that the patient will not lose his normal habits of social adjustment and will not become desocialized in the way that he has in the large hospitals.

Privacy for the individual patient will be possible and normal to the degree desired. Privacy is completely lacking in the present large mental hospitals. This is one of the many important respects in which life in the large mental hospital is abnormal and desocializing.

The patient will have a choice between spending his time in the small day-room with a few others or in larger day-rooms when he desires the company of a larger group or activities which require a larger group. This will provide a beneficial effect by increasing the number of situations in which the patient can make decisions for himself.

The dormitories housing 60 to 100 beds will not exist in the small mental hospital. Essential to effective therapy is the feeling on the part of the patient that he is being treated as a patient. This is very difficult and often impossible in the huge mental hospital.

Economic Factors

The capital cost will be less per bed than in the case of the present monolithic structures.

The proposed community hospital can be built in units (148 to 418 beds) which would allow of adapting the function or increasing the size as required.

The small hospitals can be converted to geriatric units, chronic hospital units, nursing homes or even housing projects if there should come a time when they are not needed for psychiatric purposes.

It presently costs on the average $60 to admit each patient by ambulance to the Saskatchewan Hospitals. This cost can be greatly reduced by the shorter distances.

The maintenance cost for the smaller buildings will be less.

There will be no greater cost in providing treatment and nursing care.

General Advantages

The rate of recovery and return to the community will undoubtedly be much higher in the community mental hospitals. The present huge size and remote location of mental hospitals make them suitable for "putting away" with implied permanence, those who become mentally ill. A hospital of small size, situated within the community, can be a basis for an active program to resocialize patients and return them to their homes. It has now become clear that the large, remote mental hospital has had a specific harmful effect on many patients and has of itself been responsible for the extension of their stay to 5, 10 and even 20 years. When a patient stays for any length of time in the abnormal social situation of the large mental hospital he becomes less fit to live again in the community.

Better preventive work can be done by the small hospital. Fewer patients will be admitted because it will be possible for the hospital staff to treat many on an out-patient basis. Of those who are admitted, many will stay

for a shorter time. Earlier admission occurs when the hospital is near at hand and is accepted as part of a community. It has been proven by extensive statistical studies that the earlier in his illness the patient is admitted, the shorter will be his time in the hospital. Fewer patients will need to be re-admitted after discharge because the hospital staff working within the community will be able to do a much more complete job of rehabilitation.

The community hospital will make it possible to provide such variations of service as day hospital care, night hospital care, weekend care, and hostel accommodation for patients who are being rehabilitated into jobs. These are services which make it possible to adapt the treatment to the circumstances or occupation of the patient and therefore make it possible to give the necessary treatment with the minimum of disruption of the patient's life and work. The more this can be done, the less difficult becomes the rehabilitation of the patient. Where these services have been tried, they have been found extremely valuable in reducing hospital admissions and hastening recovery. They cannot be carried out in mental hospitals which are remote from the communities which they serve.

SUMMARY

In Saskatchewan, it is our opinion that the old-type large custodial institution is an anachronism and should be replaced by the psychiatric regional centre built around the small community mental hospital so that the mentally ill may receive an adequate degree of care in surroundings similar to those provided for the physically ill.

THE CONCEPT OF WELLNESS

Although the concept of wellness, as something very much more than just the absence of sickness, has been behind the thinking of many doctors and health workers in the first half of the twentieth century, nevertheless the curing of disease and the saving of lives has been the primary preoccupation both of physicians and health workers.

Probably nowhere has the concept of wellness been so aptly expressed as in the Constitution of the World Health Organization, which in its preamble, states that "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." It goes on to say that "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social conditions" and that "The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States."

Halbert L. Dunn, M.D., Ph.D.
Points of Attack for Raising the Levels of Wellness
Jour. Nat. Med. Ass., 1957, 49: 225

Behind The Scenes In Virus Research

THOMAS M. RIVERS,[1] M.D.

This address was delivered at a meeting of the Advertising Club of Baltimore, Maryland, on December 11, 1957. It is reprinted with the kind permission of the author and the Baltimore City Health Department.

Members of the Canadian Public Health Association who are not familiar with the study of viruses will appreciate this unique presentation of the subject by one of the leading scientists, who is an outstanding authority on viruses. Those who are in touch with the newer knowledge of viruses will read with interest and profit this presentation of a difficult subject. Dr. Rivers has succeeded in interpreting the newer knowledge of viruses in a manner which makes the subject intelligible to those who are entirely unfamiliar with laboratory procedures.

I WOULD like to talk to you about viruses. This is a subject that should be of interest to all of you, since the chances are that at this moment everyone in the room is harboring a virus of some kind. I am glad to see you looking so healthy in spite of the invasions to which you are subject!

The fact of the matter is that, to a large extent, man lives at peace with his viruses. His defenses against them are generally good; it is the exception that bothers us. And to our natural defenses we are now learning to add new defenses created by vaccines. We are making progress.

Viruses are all around us and within us. It is even possible that some viruses help keep us healthy. We don't know for sure, and this is only one of many things we do not know.

Few of us have ever seen a virus, but all of us have seen the results of virus activity. Those of you who have worked with the National Foundation have seen the effects of the polioviruses. Others of you, who may be gardeners, possibly raise the kind of tulips in which the color of the petals breaks in ragged patterns. This, too, is caused by a virus—a plant virus.

There are authorities who can document the loss of battles because of viruses, and even today virus diseases in some parts of the world have a tremendous economic impact and help write the history of our time. Indeed, when experts think about bacteriologic warfare, as it is called, they often think of viruses. Not so much viruses to destroy us directly, but viruses like those that cause rinderpest and foot-and-mouth disease, which could devastate our cattle and markedly decrease our food supply.

Nearly everything relating to the discovery of viruses and their differences from other infectious agents has happened within my lifetime. You may look at my white hair and say: "Well, that's a long time." But it is not a long time in science. I entered medical school in 1909, the year during which Dr.

[1]Medical Director, National Foundation for Infantile Paralysis.

Karl Landsteiner, in Vienna, discovered that a virus is the cause of poliomyelitis. This does not mean that nothing was done about viruses earlier. Jenner discovered smallpox vaccine in 1798, and Pasteur's vaccine against rabies came later. But neither of these men of curiosity and creativity knew what viruses were, or even if such things existed.

How Viruses were discovered

Let me tell you a little about how viruses were discovered, because it helps explain how science moves ahead, and perhaps throws a little light on what we are doing in the research program supported by your efforts in the March of Dimes.

In the 1880's, Louis Pasteur founded what we know as the germ theory. Fairly rapidly thereafter the causes of many diseases were found and seen under the microscope. Most of these causes were what we know as bacteria, and they are, as you know, small organisms that enter the human body by various routes and make us sick or even cause death.

But there were a number of diseases left over, so to speak, for which no cause could be isolated. There were fluids which, when injected into animals or human volunteers would cause the diseases in question, but no bacteria were found that could be held responsible. Furthermore, scientists passed these fluids through filters, with pores so small that all bacteria and larger organisms were removed. Whereupon a strange thing was discovered. Even after passing through filters small enough to remove all known organisms, there was still something left that would cause disease. You couldn't see it, but it was there.

Scientists didn't know what it was that passed through their fine filters, but they knew it was something. And they finally decided to call this something a virus. They still had not seen it, but they knew it existed. It was not until scores of years later, with the advent of the electron microscope, that we began to see viruses and to learn that they are tiny particles so small that they do slide through our filters, but powerful enough to cause disease or death.

What is the picture that comes to the mind of the average man when he thinks of a living organism that causes disease? I do not know exactly, but I imagine he thinks of a little bug, perhaps with legs and feelers. Well, viruses are nothing like this at all. The smallest ones are smaller than the least part of any tiny insect. They have no legs and no feelers, no eyes and no stomach. They are scarcely more than chemical specks.

It is natural to wonder how so small and primitive a thing can really be alive. If it has no mouth and stomach, how can it eat and digest? How can it live?

The answer is interesting, and it is a key to the entire study of viruses.

Viruses can grow only within living cells

Viruses can grow and reproduce only *within* living cells. Outside of such cells, they are inert pieces of matter, neither eating nor breathing. Because they have no machinery for reproducing themselves without help, they de-

pend on the very complex machinery that exists within the cells of which we, like plants and lower animals, are composed.

This was not known at the turn of the century, and I take some pride that it was at the Rockefeller Institute, where I spent many years, that much of the basic work was done that made it clear that without living cells no virus could reproduce.

Viruses are very particular about what cells they decide to inhabit. Viruses of certain skin diseases will only attack the cells of the skin. The virus that causes tobacco mosaic disease likes the cells of the tobacco plant. It pays no attention to your cells or mine—won't attack them at all. This is a virus with a real tobacco habit. The reverse is also true. Viruses that cause you to have a common cold will pay no attention to the cells of tobacco plants. No tobacco plant has ever had a common cold.

Study of cells is most important

I have spent some time talking about viruses and cells to explain how they go together, and why the study of viruses has led us to the study of the cells themselves. It is this study that brings us to investigating the secret of life itself.

Each of us in this room developed from a single cell. Somehow or other, that single cell knew how to grow until it multiplied again and again and finally produced a human being with a nose, two eyes, two legs, and so on. This is one of the great mysteries of creation. How, we ask, can anything as small as a single cell have intelligence enough to know what it should develop into? How did your single cells have sense enough to develop into fine Advertising Club members and March of Dimes volunteers and not into tobacco plants?

Just imagine—Nucleic Acid!

Well, we don't know, but we are beginning to have an idea. In each cell is a complex chemical called nucleic acid. It now seems certain that it is this acid which directs the growth of that cell. It has been discovered, partly through March of Dimes projects, that this acid is composed of twisted strands of material rather like vines covered with berries.

The berries are little groups of atoms, and we now believe that the order in which these groups are attached constitutes information. This information has been likened to the instructions which are punched on tape and fed into the great calculating machines which are used today to perform mathematical problems that men are either too slow or too lazy to do for themselves. We think that a certain arrangement of berries, for example, means that a child will grow to have blue eyes instead of brown, and that another arrangement elsewhere on the vine may mean that you will have red hair instead of blond. Sometimes the arrangement is not what it should be, and a child may be born with clubfeet or some more serious defect.

The virus, nucleic acid and the cell and polio

What in the world has all this to do with viruses? Just this: A virus *also* contains nucleic acid. And when it invades a cell, it is the *virus*'s acid which takes over control of the cell's life.

The acid from the virus says to the cell: "Quit working for yourself and start working for me!" And that is exactly what happens. The cell stops growing normally and grows as the virus directs.

And what does the virus direct it to do? It directs it to produce more virus. The cell becomes a virus-producing factory! Then each virus particle it manufactures may infect another cell, and the process starts over again. It is a biological chain reaction. Generally, the infected cells are destroyed when they are taken over by the virus. In the case of paralytic polio, nerve cells are involved. When enough of them are destroyed, the brain can no longer send messages through them to the muscles and paralysis results.

All that I have told you has come about through the work of hundreds of scientists in many laboratories. Much of it has been learned in programs supported by the National Foundation for Infantile Paralysis. What seems like a logical explanation today seemed only a few years ago to be a tangled mystery.

Dr. Enders, Dr. Robbins and Dr. Weller

It would take a long time to recount what has been learned about viruses and cells in our research program. But one discovery, I believe, should be mentioned. That is the work of Drs. Enders, Robbins and Weller who, in 1949, showed that polioviruses could be grown in cultures of non-nervous tissues in flasks or bottles.

This work led not only to the Salk vaccine, and to a Nobel Prize for Dr. Enders and his associates, but to a tremendous expansion of the whole field of virus research. It became possible to study viruses of all kinds growing in living cells in test tubes, where previously many of them had to be studied in costly animals. Experiments that once took hundreds of monkeys and all the difficulty they entail can now be performed speedily in a few racks of tubes. There are already at least two new experimental vaccines for diseases allied to grippe or the common cold which are produced by means of tissue cultures developed along lines suggested by Dr. Enders and through additional techniques devised by Dr. Salk. No man can predict how much more will come of these methods.

In the old days scientists had a hard time telling when they *were* dealing with a virus. Today, methods derived from Dr. Enders' Nobel Prize-winning discovery make it easier and very sure.

New viruses, drugs and vaccines

Over the last ten years or so, mostly in connection with polio research which your efforts have made possible, we have discovered dozens of new viruses that were not known before. This was really reversing the usual scientific attack on disease. In the early days we started with a disease and tried to find out what caused it. We still do this of course. But with these new viruses, we have started by finding the viruses and we are now trying to find out the diseases with which they are associated. We do know that some of them cause diseases that are often mistaken—even by experts—for non-paralytic polio, and that some can actually cause paralysis as well. Some of the Coxsackie viruses (they are named after the town in New York State

where they were first found) have caused myocarditis and death in a number of children. In other words, at least some of these viruses present very serious problems, and they must be studied further. We may wish to develop vaccines against some of them, or possibly to combine these vaccines with the Salk polio vaccine.

The search for drugs active against viruses, including the polioviruses, goes back many years. Sometimes one feels that almost everything has been tried. Experiments have included work with orange juice, common salt, snake venoms, rare dyes, etc. As of now, however, we do not have drugs against viruses which compare in effectiveness with the so-called wonder drugs that are used in the treatment of non-virus diseases. You all know about the sulfa drugs, about penicillin and the rest. These wonderful compounds just do not work against viruses.

It's no problem to find a drug that will kill viruses. Ordinary household iodine will do that. But you cannot have people drinking iodine. Drugs that will kill the viruses also kill human cells, and are, therefore, no answer to the problem. But viruses multiply only in living cells, and reproduce themselves by taking over control of these cells and by turning them into production lines for more virus. So, today, our drug research is aimed at preventing this from happening. The compounds with which we are working don't attack the virus itself, but we are trying to find out whether they will prevent the virus from taking over control of the cell.

There are three possible ways of doing this, at least in theory. One would be to prevent the virus from entering the cell, which might be done by a chemical which would protect the cell wall. A second way would be to prevent the virus from controlling the cell once it gets inside. A third way would be to let the virus enter and control the cell, but somehow to keep the cell closed so that the new virus produced inside it couldn't get out. This would stop the spread of virus within the body.

Our grantees are beginning to learn how their drugs work and why. This is a big step forward from the days when we simply tried a lot of different chemicals, hoping that some of them would work, but not understanding the mechanisms involved. With the delicate equipment now available (and it costs a great deal of the money you raise) we can tell just when a drug acts, whether before the virus attacks the cell or after. Furthermore, organic chemists can make compounds to order, and can predict to some extent that changing the position of just one atom in a complex molecule will change its effectiveness against virus action.

Of course there are tremendous problems. All of the compounds being tested are poisonous. We have to find drugs which will work against the viruses when given in quantities small enough so that they will not damage the human being. But this kind of research is a window looking out at the future, and I think the day will surely come when we will find drugs as effective against virus diseases as present-day drugs are against bacteria.

We have talked about viruses and cells, and we have said that poliomyelitis, for example, occurs when viruses attack cells and make them sick. But in every disease of mankind and of all living things, the problem is sick cells. Either

the cells are destroyed or damaged by viruses, by bacteria, by other organisms, by toxins, etc. or they are sick because of reasons we do not yet understand.

And what about cancer?

One of the diseases we don't understand is cancer. We know that it is a biological whirlwind, where cells give up their orderly patterns of growth, where they multiply wildly against the rules they should observe. Look at your fingers and see how perfectly formed they are. Something told them to grow that way. Something stopped their growth when they got the right size.

We said before that it is the mysterious substance called nucleic acid which directs cells' growth and multiplication. And we said that the nucleic acid in viruses takes over the control of infected cells. But the growth of cancer cells, too, is controlled by nucleic acid. So, you see that in studying viruses and cells we are very close indeed to the study of cancer cells, for cells sick from a virus are in many ways similar to cells that are sick from cancer.

In our drug research, for example, we seek chemicals which will interfere with the production of virus nucleic acid by infected cells. Will such drugs, if they prove successful, also interfere with the action of nucleic acid in cancer cells? We do not know. My guess is that successful drugs for viruses will not prove a cure for cancer, and at first will probably be effective against only a few viruses. But they will provide a lead in one of the greatest scientific quests in history.

We already have another lead against cancer. You recall that we said Dr. Enders and his associates learned how to grow viruses in cells living in tubes and bottles. Out of this knowledge has come a great deal of work on growing cells. And some of our grantees have found that as their cells have grown in bottles and tubes they have somehow changed. Many scientists believe that these cells, have become cancerous. In other words, something in the way they were handled caused them to turn into cancer cells. If we can find out what that something is, we will have come a long way in the fight on cancer.

Furthermore, there are many authorities who believe that cancer is caused directly by a virus, or perhaps by a number of viruses. Except in the case of several rather rare animal cancers, this has never been proved, but the possibility must be kept in mind as work moves forward.

There are those who believe that the Salk vaccine was a culmination of the research effort of the National Foundation for Infantile Paralysis. It was a magnificent achievement, and one we can all be proud of having taken part in. But with all sincerity I say that our research program would be considered of great historic importance without the Salk vaccine. And the greatest benefits from it, I have no doubt in the world, are yet to come.

We have just begun to fight

We have not reached an ending; we have just begun. We have developed the methods and techniques to achieve a wonderful beginning, and from it we now move forward into a future that is so filled with promise that it almost staggers the imagination.

We have uncovered so many leads into the unknowns of science and disease that our whole feeling is one of moving forward. Instead of slowing down our research effort, we plan to expand it and to enlarge our studies of polio-related diseases. We plan to move toward the future discoveries that are just waiting to be made. I urge you to think of yourselves in true perspective, as being in at the beginning of a great *new* period of scientific conquest, for that is the fact of the matter.

Every speaker who claims to be a part of the onward march of science ought to use visual aids, which we are told make any talk a little more bearable. I have saved my visual aid to the last.

You remember that I spoke of Dr. Enders and his associates in Boston, and of the work they did which led not only to the Salk vaccine but to a whole flood of discoveries touching on many diseases other than polio. I have here something intimately connected with that work, and I thought you might like to see it.

The Enders Flasks to the Smithsonian Institution

Here are the original flasks in which Dr. Enders, Dr. Weller and Dr. Robbins first showed the cell-destroying properties of poliomyelitis virus in non-nervous tissue grown in flasks. Little bits of tissue are still there. I hasten to assure you that the virus is no longer dangerous; these flasks have been heat treated to inactivate it. The efforts of you and people like you provided the money that bought these flasks. As a matter of fact, it helped provide the training for at least one of the scientists who knew what to put in the flasks.

This modest rack and these small flasks are on the way to the Smithsonian Institution in Washington. They will be on display there, because they have become part and parcel of our historical heritage. Not only do they represent a Nobel Prize and a winning battle over a tragic disease—they represent the beginning of the many discoveries that already have been made because of Dr. Enders' work as well as others yet to come. There will be more racks of flasks in the future and more brilliant discoveries. We stand at the threshold of probably the greatest era in virus research the world has ever known. It will bring freedom from pain and prevention against many diseases, I am sure. To all of you, I say welcome to this research team. Go out and work as hard as you can in the months and years ahead. You have a part of the future in your hands. Nurture it with zest!

Listeriosis in the Newborn

JOHN W. DAVIES,[1] M.B., B.S., D.P.H, JAMES PARKER,[2] M.B., B.Ch., and AOD McDERMOTT,[3] M.B., B.Ch., D.P.H.

DURING the past few years *Listeria monocytogenes* infections in the human have been recorded more frequently. It is still, however, a comparatively rare disease, fewer than 150 cases having been recognized. It seems likely that the disease is much commoner than previously thought and that many cases remain unrecognized. It is also of interest because of the possible connection between the disease in animals and its transmission to man.

Listeriosis is of world-wide distribution, and the organism is reported to have been isolated from a wide variety of animal hosts both wild and domestic, including rabbit, guinea pig, mouse, rat, chinchilla, cattle, goat, sheep, dog, chicken and canary (1). Barrales (2) records a laboratory outbreak of listeriosis in lemmings and reviews the reports of epizootics which have occurred in other animals in Canada. The disease in animals is very variable, different species reacting to the organism in a different manner. Sheep, cattle and goats develop a meningo encephalitis with lesions of the white matter of the brain. In rabbits and guinea pigs a generalized infection occurs with lesions and areas of necrosis, particularly in the liver and suprarenals. In Labrador, a distemper-like disease among dogs is said to have been caused by the organism. Abortions and metritis have been encountered among horses and cattle and this bears many similarities to a type of the disease existing in the human new-born and foetus.

Human listeriosis, which seems to be particularly prevalent in Germany, is now being reported more frequently in the English literature. Recently, case reports have appeared from Canada, the United States and Great Britain. Since the first isolation of *Listeria monocytogenes* in Canada by Doreen W. Stoot (3) (Toronto) in 1951, 19 cases are listed which were reported by Allin and Kemper (4), Johnson *et al.* (5), Roy (6), R. W. Reed *et al.* (7) and Girard and Gavin (8), distributed as follows: two in Quebec (Montreal), nine in Ontario, one in British Columbia and seven in Nova Scotia.

Many types of the disease have been described of which meningitis is probably the commonest, although there is in some cases considerable overlapping of syndromes. Murray (1) gives the approximate incidence in humans as follows: meningitis or encephalitis (33%), granulomatosis (29%), septicaemia (21%), mononucleosis (8%), conjunctivitis (6%).

Granulomatosis "infantiseptica" is a term used by Potel (8) to describe a type of the disease recently recognized among infants in Germany from which

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L. monocytogenes has been recovered. The infants suffer from an acute septicaemia and the disease is characterized by granulomata and necrosis of the lungs, brain, stomach, suprarenals and, in particular, the liver. Infection is acquired by inhalation and swallowing of infected liquor amnii from which the organisms can be obtained in large numbers. The clinical picture in infected infants is varied, two main types predominating–the septicaemic and meningitic. The onset may be up to two weeks after birth, often affecting premature babies and characterized by a septicaemia with severe jaundice, a purpuric skin eruption and an enlarged liver. A history of fits with dyspnoea and cyanotic attacks combined with a distended fontanelle is typical of the meningitic type of disease. A polymorphonuclear leucocytosis is commonly found and the organism may be detected on culture in the blood or cerebrospinal fluid. The latter generally shows a polymorphonuclear response with a diminished sugar and increased protein content. There is a high fatality rate in the foetus though surprisingly low in the mother. Potel has collected over forty such cases in Germany and a high proportion of the Canadian cases are of this type.

The case to be reported fits into this category. Though unusual in certain respects, this case draws attention to some of the main features of the disease. Many previous writers have made little attempt to investigate its mode of transmission and epidemiology, and though lack of facilities proved a hindrance, we wish to emphasize the importance of performing certain investigations in any future cases. Its alleged rarity and the possible connection between the disease in animals and its transmission to the human make its study of particular interest.

A Case of Listerial Meningitis in the Newborn

This seven-day female infant had progressed satisfactorily after birth until two days prior to admission to hospital on November 17, 1956, when she developed a cough and showed listlessness which gradually became worse. One day prior to admission, diarrhoea ensued with passage of green stools and she refused her feeds. The cough at this time was non-productive but became more marked and the mother noticed dyspnoea for the first time. On the day of admission she became alarmed at the child's condition and called her own doctor who advised immediate hospitalization.

The child was delivered normally at full term by a midwife at home. Labour lasted 6 hours and the placenta and liquor amnii appeared normal. The child, weighing 8 lb. 8 oz. at birth, appeared well and was fed artificially every four hours. The mother had been well throughout the present pregnancy, which was her ninth, and denied having any illness. The husband and remaining eight children, whose ages ranged from two to twenty-one years, were all well. There had been no contact with any ill human being and no evidence was obtained of cases of glandular fever in the neighbourhood. The house was infested with mice until about 2 months prior to the infant's illness. At this time they suddenly disappeared and were not seen again. A domestic cat, which appeared well, had always been kept. There had been no contact with other animals.

On examination, the positive signs were as follows: The child was pale and in a moribund condition, with a temperature of 101° F. Respirations were shallow, 60 per minute and the lips and ears were slightly cyanosed. Auscultation of the chest elicited crepitations at the left apex. There was no dullness to percussion and the trachea was central. Neurological examination showed bulging of the anterior fontanelle. There was no neck rigidity and Kernig's and Brudzinski's signs were negative. The other systems were essentially normal. Lumbar puncture yielded a very turbid fluid that flowed freely and was under slightly increased pressure. Cell count was 5,850 per c.mm.; (98% polymorphs); protein–500 mgm.%. There was insufficient material to complete the chemistry.

In the smear many gram positive bacilli were demonstrated. These were 2–3 m. long × 0.5 m. in breadth and were tentatively identified as diphtheroids. Culture of the spinal fluid later yielded a profuse growth of *Listeria monocytogenes.*

Treatment and Progress:

The child was placed in an isolette and received oxygen, intravenous fluids, and a total of 1.5 million units of penicillin, 0.5 gm. of chloromycetin and 0.5 gm. of sulfadiazine. In addition, penicillin 5,000 units was given intrathecally. In spite of this, the child's condition steadily deteriorated; it began to vomit coffee grounds vomitus one hour after admission and was expectorating abundant blood-tinged mucus. Eight hours after admission, the child appeared pale, slightly cyanosed and in a shocked condition, which improved somewhat, when given 10 mg. of hydrocortisone intravenously. Auscultation at this time revealed widespread crepitations in both lung fields. Convulsions began one hour after admission and continued until death, 15 hours later.

On autopsy, the lining of the upper respiratory tract was quite injected and contained red frothy sputum. The lungs were solid and thick, being not unlike liver in appearance. The pleural cavities each contained 50 cc. of green watery fluid. The stomach contained approximately 100 cc. of clotted blood and in the fundus there was a large ragged ulcerated area in the mucosa, measuring 2 cm. across, surrounded by several smaller ones measuring up to a few mm. in diameter. The liver was slightly enlarged and weighed 175 grams. Its parenchyma was pale brown in colour on cut section and showed multiple small areas of necrosis, visible as miliary yellow spots to the naked eye. There were bilateral adrenal haemorrhages, particularly marked on the right side. The brain was congested, and in the sulci of the cerebrum and along the entire base extending into the medulla and cord were collections of pale green pus sufficient to obscure the vessels and cranial nerves. Microscopically, one of the most interesting features was the finding of frequent intercellular small bacilli and cocco-bacilli in the phagocytes of the exudate in the base of the brain. In some regions, the exudate consisted predominantly of lymphocytes and extended for a short distance in the superficial grey matter of the cerebrum. In the cerebellum perivascular cuffing by lymphocytes was marked. The lungs showed a focal haemorrhagic pneumonia and the cellular infiltration was formed by lymphocytes, monocytes and medium size macrophages with abundant eosinophilic cytoplasm. In the liver, changes consisted of some small typical areas of focal necrosis of the parenchyma.

Characteristics of the Organism:

The characteristics of the organism isolated from spinal fluid and brain were typical of those described in reference books. The rods were Gram positive non-sporing organisms with rounded ends, approximately 0.5 m. in diameter by 1–3 m. in length. They occurred singly, in pairs, short chains and in pallisade arrangements. A hanging-drop preparation in both cultures incubated at 37° C. presented a characteristic tumbling motility. On blood agar a zone of beta haemolysis was observed. Growth occurred in 6.5% saline broth at 34° C. and also on a blood agar plate kept at 4° C. for 30 days.

A rabbit was inoculated intravenously with 0.5 cc. of an 18-hour broth culture and a monocytosis of 4 to 21% was obtainel in 48 hours. The strain was sensitive to aureomycin, chloromycetin, erythromycin, neomycin, terramycin and streptomycin, but insensitive to penicillin.

Investigations of family and home conditions:

Sanitary conditions of the dwelling and its surroundings left a great deal to be desired. There was gross overcrowding and complete absence of facilities for disposing of human excreta. Water (grade D. mean probable number of coliforms–23) was obtained from a well situated under the dwelling. A short distance away from the house was an exposed dump used for garbage disposal. The condition of the interior of the house showed obvious signs of neglect. In view of the fact that *L. monocytogenes* has been isolated from rodents, an attempt was made to trap a mouse. This remained unsuccessful for many weeks but one was finally secured. The domestic cat and mouse were then sacrificed and autopsy performed. The autopsy failed to demonstrate evidence of listeriosis, nor was the organism isolated from blood or stool specimens. All family contacts were examined and blood cultures, heterophile agglutination tests and throat swabs were obtained in each case. These proved negative. It was disappointing to be unable to obtain a vaginal smear from the mother immediately post partum owing to her refusal. When performed almost six months later the listeria organism failed to grow on culture.

In this case, conditions at the home might be said to have been ideal for transmission of disease to other family members. It is rather surprising, therefore, that investigation failed to reveal active disease in the contacts, although latent infection could not be excluded owing to lack of facilities for performing agglutination tests.

Discussion

Listeriosis in humans in Canada is being diagnosed more frequently. There are reasons for believing that the actual incidence is even higher. A rather common finding, that the mothers of affected children often have no history of illness during pregnancy, makes us believe that subclinical or latent infections may be fairly common. Although the final diagnosis in a case rests upon the bacteriologist, when prevailing cases are confined to a localized geographic area a shrewd clinical suspicion will often arise (1), particularly in the type labelled "granulomatosis infantiseptica" which has a rather typical clinical picture. In cases presenting with meningitis, the spinal fluid usually contains an excess of polymorphs although occasionally lymphocytes predominate. In this instance they may be confused clinically with tuberculous meningitis as the c.s.f. sugar content is often quite low. In the laboratory, probably the commonest fault is to label the organism wrongly as a contaminating diphtheroid; this should not occur if motility tests are performed. The presence of Gram positive bacilli in the spinal fluid should immediately bring the diagnosis to mind. In this respect it is worthy of note that in five of Dedrick's (10) eight cases the organism was detected on direct smear.

In order to isolate the organism from suspected cases, blood, c.s.f., milk, stool, urine or other affected tissues should be examined bacteriologically. In illnesses such as the above, examination of meconium, liquor amnii and placenta when available, with performance of blood cultures and agglutination tests in the case of the mother and other contacts, will give important leads in deciding the mode of transmission of infection. The isolation of the organism from stools is a difficult undertaking. Murray (11) recommends a technique based on Gray's method of growing the culture at 4° C., or, K. Shimizu's use of guanofuracin, which largely inhibits other organisms but allows listeria to grow.

There are four main agglutinable types of *Listeria monocytogenes*. Seeliger recognizes two sub-types to type 4. Most Canadian strains are types 1 or 4b. Agglutination tests can be performed although their interpretation is by no means easy. Best results are obtained by using the isolated strain concerned to perform H and O agglutination tests, but it must be remembered, even in bacteriologically proven cases, that the serum agglutination may be negative. Rising titres are of diagnostic significance in the early stages of the disease but rapidly fall to normal with recovery and, therefore, are of little value in making a retrospective diagnosis.

The epidemiology of listerial infections in humans remains obscure. The disease may affect persons of all ages. In most cases reported, there has been failure to incriminate animal sources and in many there has been no apparent animal contact. Occasional cases have been described where a particular animal species has been suspected such as the case of Odegaard (12) *et al.* probably transmitted from sheep. In view of the numerous animal hosts, it

would be surprising were they not connected, in some manner, with the disease in humans. The role played by rodents themselves, as well as the possible contamination of food, may be important. Certainly, the sudden and complete disappearance of the mice from the home in this case is suspicious of an epizootic among them, in spite of the fact that blood and stool cultures proved negative from the mouse finally caught. It may be well worth while paying more attention to this aspect in future, particularly as mice have been shown in some cases to harbour the organism. Of particular interest for epidemiologic investigation would be the cases described, confined to a small geographical area such as those of Potel (9) and Eck (13) in Germany.

Possibly greater attention should be paid to animal products in the spread of this disease, particularly as the organism is rather resistant and survives naturally for months at room temperature. It can also survive extremes of temperature growing profusely at 4° C. and surviving 5 minutes at 80° C. For this latter reason doubt has been cast on the effectiveness against listeria of pasteurization of milk. The possibility of human to human infection in nurseries has been suggested by certain investigators, only to be categorically denied by others. Stanley (14), investigating the possibility of healthy carriers, found only two cultures of organisms resembling *Listeria monocytogenes* out of 3,558 nose and throat swabs examined. The portal of entry in humans is not definitely known. Julianelle suggested the nose and throat as avenues of infection and to support this theory, Roy (6) has recently reported a child with a pure respiratory infection due to this organism. Murray (11) favours the gastro-intestinal tract and experimental animals have been successfully infected by this route, particularly when there has been some change in environment or method of feeding. Pregnant animals seem particularly susceptible to infection. Where facilities are available, further attention should be paid in future cases to the exclusion of the possible sources of infection referred to above, as well as to a thorough investigation of all contacts.

In the cases of listeriosis described by Potel *et al.*, one of the outstanding features was the isolation of *L. monocytogenes* from the vagina of the mother. Their observations suggested that mothers during pregnancy suffered from an infection, which might or might not give rise to clinical illness, but led to trans-placental infection of the foetus and infection of the liquor amnii through the foetal urine, followed by abortion or premature birth of an infant with septicaemia. Similarly swallowing or inhalation of infected liquor or other material during passage through the birth canal, might produce infection. The combination of the delivery of a normal full term infant in an apparently healthy mother and the production of marked pneumonic changes after a short interval makes the latter mode of infection most likely in this case. Culture of the blood, vagina, amniotic fluid, and histological examination of the placenta, might have yielded more significant information.

Although our case undoubtedly suffered from a septicaemia, the picture was predominantly that of a meningitis. The occurrence of intercellular bacilli and cocco-bacilli in the phagocytes at the base of the brain is interesting and produced a rather characteristic microscopic appearance. The unusual bilateral haemorrhagic bronchopneumonia with hydro-thorax was also probably due

to listerial infection, though the causative organism was not isolated from the lungs or pleural cavities. The distribution of these severe lesions in the lungs suggests that infection may have occurred by aspiration of infected liquor amnii or other material. The adrenal haemorrhages and gastric ulceration in this case is probably the result of septicaemia and it is not surprising in view of the therapy that blood culture at autopsy was negative. The small areas of focal necrosis distributed through the liver parenchyma represent one of the common confirmatory findings in listerial infection.

There are many discrepancies in the sensitivity of reported strains to chemotherapeutic and antibiotic agents. Resistance rapidly develops to streptomycin and many strains are insensitive to penicillin. Coulombier (15) recently has reported, in five of eleven recorded cases of granulomatosis infantiseptica, the patient has survived after treatment. This favourable response to antibiotic and chemotherapy increases the importance of recognizing such infections and commencing appropriate treatment at an early stage.

SUMMARY

A fatal case of *Listeria monocytogenes* meningitis in a full term newborn infant is described. Infection was probably acquired from the mother during labour. The source of infection was not identified but attention is drawn to the possible role of mice and rodents. A brief résumé of our knowledge of this condition is given; suggestions are given for further investigations in future cases if facilities are available and emphasis is placed upon the importance of early diagnosis and treatment if antibiotic or chemotherapy is to be successful. It seems probable that listeriosis is not so rare as is suggested by the comparatively small number of reported cases.

ACKNOWLEDGEMENTS

We wish to thank Dr. J. Josephson, Director, Public Health Laboratories for the laboratory and autopsy reports on this case; Mr. D. Strong, Chief Health Inspector, Department of Health for assistance with the investigations; and Professor E. G. D. Murray for much helpful information.

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Psittacosis in a Quebec Aviary[1]

PAUL GENEST,[2] D.M.V., D.Sc.

IN November 1956, several exotic birds, nine of which were of the *Psittacidae* family, were imported from Holland for educational purposes. On arrival they were kept under quarantine for seven weeks during which time they showed no evidence of disease. Several days after the expiration of the quarantine period a masqued love-bird (*Agapornis personata*) suddenly died. An autopsy revealed lesions resembling those of psittacosis. Investigations were made on the incidence of the disease among several of the imported birds and other contact birds in the aviary. Complement-fixation tests were positive in seven of the psittacine birds.

The isolation of a viral agent, with tinctorial characteristics and development cycle similar to the psittacosis virus, was made in seven of the nine birds by intraperitoneal inoculation of blood or a suspension of organs into mice. Two of the strains were infectious for mice. Death occurred within seven to ten days and the peritoneal exudate contained virus. Complement-fixation tests made with antisera produced from guinea-pigs with repeated injection of mouse material confirmed that these strains belonged to the psittacosis group. A third strain from the fifth serial passage in mice elicited a subacute infection of twenty to thirty days' duration.

The four other strains did not cause any symptomatic disease, but impression smears from the abdominal organs of the infected mice sacrified twenty days after inoculation demonstrated numerous intracellular colonies comparable to those described by Bland and Canti (1).

An eighth strain, recently isolated from the author who suffered a course of infection, reacted in a similar manner to that of the other latent strains. An antigenic study of these viruses is currently in progress.

Apparent discrepancies have been found between complement-fixation and mouse inoculation tests (table I). Thus in one amazon bird (*Amazona aestiva*), the virus was not present, whereas during two serological tests the results were positive having increased titers. On the other hand, virus was demonstrable in the tissues of three birds which were negative to the serological tests.

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[1]The work reported herein was conducted at the Quebec Veterinary Research Laboratory with the co-operation of the Institute of Microbiology and Hygiene, University of Montreal.

[2]Director of the Quebec Veterinary Research Laboratory, St. Hyacinthe, Que.

TABLE I—SEROLOGICAL AND VIROLOGICAL INVESTIGATION

Species	Origin	Complement fixation	Virus isolation	Experimental disease (mouse) Strain	Evolution	Lesions	Type of inclusion bodies
Australian crested dove (*Ocyphas lophotes*)	Holland, 1956	0	0				
Blue-fronted amazon (*Amazona aestiva*)	Holland, 1956	1:128	0				
Yellow-headed amazon (*Amazona orchrocephala*)	Quebec, 1949	1:16	+	AO	subclinical	slight splenomegalia (5th passage)	intracellular colonies
Festive amazon (*Amazona festiva*)	Montreal, 1954	1:4	+	AF	subclinical	splenomegalia (6th passage)	intracellular colonies and granules
Yellow-headed amazon** (*Amazona ochrocephala*)	U.S.A., 1956	±1:2					
Male cockateel* (*Leptolophus hollandicus* ♂)	Holland, 1956	0	+	Cm	clinical (1st passage)	splenomegalia and peritoneal exudate	intra and extracellular elementary bodies and granules
Female cockateel (*Leptolophus hollandicus* ♀	Holland, 1956	0	+	Cf	subclinical	slight splenomegalia	intracellular colonies
Masqued love-bird* (*Agapornis personata*)	Holland, 1956		+	AP	clinical (1st passage)	splenomegalia and peritoneal exudate	intra and extracellular elementary bodies and granules
Grey parrot** (*Psittacus erithacus*)	Holland, 1956	0					
Pink cockatoo** (*Kakatoë leadbeteri*)	Holland, 1956	1:2					
Sulfur-crested cockatoo (*Kakatoë galerita*)	Holland, 1956	0	+	Kg	clinical (2nd passage)	splenomegalia and peritoneal exudate	intracellular plaques
Sulfur-crested cockatoo (*Kakatoë galerita*)	Holland, 1956	anticomplementary	+	Kd	subclinical	no macroscopic lesions	intracellular colonies
Red and yellow macaw** (*Ara macao*)	U.S.A., 1956	±1:2					
Red and blue macaw** (*Ara chloroptera*)	Holland, 1956	1:16					

*Spontaneous death, but macroscopic lesions were not seen on post-mortem.

**These birds were not under direct supervision of the author; they were destroyed without attempts being made to isolate the virus.

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The author is greatly indebted to Dr. Vytautas Pavilanis, Department of Virology, Institute of Microbiology and Hygiene of the University of Montreal, for the serological tests which were performed, and to Mrs. Serge Renaud for technical assistance.

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Vital Statistics in Nova Scotia[1]

H. E. NAUGLER[2]

THERE are no official provincial records available in Nova Scotia prior to 1864. An Act respecting solemnization of marriages was passed in the province in 1758 but there is no indication that recording of marriages was required and the Act dealt primarily with the publication of banns or the procuring of a license for marriage. In 1761, an Act was passed requiring the registration of births, deaths and marriages with proprietors' clerks in townships. This Act was amended in 1872 to provide that these vital events be registered with town clerks. None of the recordings made under this system can now be found. This is probably due to the fact that there was no central point or single administrative unit made responsible for their collection and permanent safekeeping.

In 1864, a board of statistics was established under the financial secretary for the province. Records of births, deaths and marriages were filed on a permanent basis under this provincial administrative authority until about the time of Confederation in 1867. Following Confederation, the responsibility for registration of births, deaths and marriages was passed to the newly formed Dominion government under the British North America Act, and the work was carried on until the latter part of 1876. From this date there was no official registration of births and deaths, although the filing of records of marriages was continued. The failure of the Dominion government to carry out what was believed to be its responsibility for registering the births and deaths left the province without any means of carrying on the permanent recording of vital events and eliminated any possibility of collecting needed statistics. The provincial authorities felt that this was a matter of great importance. Possibly the concern was more directly with the fact that the Dominion government was not carrying out accepted responsibility under the British North America Act than with the failure to continue registration of vital events. The Dominion government was not unaware of the unsatisfactory program for collecting vital statistics. The Journals of the Nova Scotia House of Assembly contain a letter written by the Honourable Joseph Howe, then Secretary of State for the Provinces, addressed to the Nova Scotia government dealing with the matter of collecting statistics.

Ottawa, 4th August, 1871

Sir,

I have the honor to inform you that it is represented by the Minister of Agriculture that the laws in force in the several provinces of the Dominion in regard to statistics

[1]Presented at the seventh annual meeting, Atlantic Branch, Canadian Public Health Association, held at Kentville, N.S., November 6–8, 1957.

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are so variant and unsatisfactory in their provisions as to make the establishment of an effective statistical system for the Dominion impossible, unless after much amendment and a careful and thorough revision and consolidation of the whole by Act of parliament.

The Minister of Agriculture further states that, in view of the intimate relation between the machinery necessary for the working of such statistical system and much of the machinery requisite for purposes of municipal and provincial administration, and, as such, wholly or in part under provincial control, it is desirable that an understanding should be come to, with the provincial governments in order to secure as much harmony as possible in that behalf between the dominion and provincial authorities.

I have, therefore, to request you to bring this important matter under the early notice of your government, and inform them that they are invited to communicate their views thereon to me for the information of the Minister of Agriculture.

It is suggested that it would probably much conduce to the end in view if the provincial delegates appointed to attend the immigration conference, called for the 13th proximo, were also empowered to discuss here on that occasion the means best calculated to attain it.

I have,
(Signed) JOSEPH HOWE
Secretary of State for the Provinces.

The following is a portion of the minutes of Council passed at Halifax on the 14th day of October, 1871:

"As the British North America Act deprived the government, among other matters, of its control over statistics, and vested the Executive power on that subject exclusively in the hands of the Dominion government, the council cannot perceive how the legislature or government can, by enactment or otherwise, assist the Dominion government in perfecting the requisite machinery to ensure an effectual statistical system.

"It is very difficult for the council to see how there can be a necessity for harmony between the existing machinery now exclusively controlled by the Dominion government, and a local machinery abolished by the act of confederation; but if the Secretary of State, or the Minister of Agriculture, will point out any provincial statute, now in force, bearing upon this subject which in any manner prevents the Dominion government from obtaining the requisite information, this government will be prepared to recommend such legislation as may be considered necessary in order to perfect an effectual statistical system for the Dominion."

Although permanent recording of vital events was considered of great importance, a period of almost thirty-two years elapsed before concrete steps were taken in the matter. On October 1, 1908 the provincial government passed the "Registration Act" to be administered by the provincial secretary. The system of registration provided for under that Act has continued to the present day, and while there have been a number of newer acts and many amendments since that time, the present registration system is fundamentally the same as the system set up under the Registration Act of 1908.

In 1925, what was then known as the Bureau of Vital Statistics was placed under the administration of the Department of Public Health. The legislation dealing with registration was known as "An Act Respecting the Registration of Births, Deaths and Marriages". This Act named the minister of public health as the registrar general, and the chief health officer or deputy minister of the department as deputy registrar general.

Present Legislation. Chapter 308 of the Revised Statutes of Nova Scotia passed in 1954 is termed the "Vital Statistics Act". This Act is based on a "Uniform Vital Statistics Act" drafted and accepted by the registrars and the committee on uniformity of legislation for the whole of Canada. The Act deals not only with registration of births, deaths and marriages, but also with the registration of divorces and adoptions. The minister of public health is the registrar general and the deputy minister of public health is the present deputy registrar general, although amendment to the act now provides that a person other than the deputy minister may be appointed deputy registrar general.

In addition to the Vital Statistics Act, there is also the Solemnization of Marriage Act, dealing with the requirements for the registration of clergymen and the civil requirements for the solemnization of marriages in the province. This is administered by the registrar general, who is also charged with the administering of the Change of Name Act.

Administration. The province is divided into registration divisions. Division registrars and deputy issuers of marriage licenses are appointed to carry on the work of collecting the records of vital occurrences. All the records collected are sent to the central vital statistics office where they are processed and filed for permanent safekeeping. The central vital statistics office, situated in the provincial administration building, Halifax, is under the administration of the minister and the deputy minister of the Department of Public Health and is referred to as the Division of Vital Statistics, Department of Public Health.

The many thousands of people who annually turn to the division for copies of the permanent records of their births and marriages and of the records of deaths of relatives, indicate the great need for permanent record-keeping. Official certificates, bearing the seal of the registrar general, and numbering well over twenty-five thousand are issued annually by the division to persons requiring them for employment purposes, to obtain passport and visa clearance to other countries, for enrolment in schools, proof of death for collection of insurance, settlement of estates, and many other legal requirements.

Registration of births. The birth of every new-born child in the province must be recorded within thirty days of the date of birth. The order of responsibility for completing the registration is: the mother of the child, the father of the child, the person standing in the place of the parents, the person who attended at the birth, the occupier of the premises where the child was born. The father of a child born out of wedlock is not responsible for the registration of the birth of the child. When the division registrars receive notice that births have occurred in their registration divisions, they immediately supply the prescribed blank forms to the persons responsible for completing the registrations. These persons complete the forms, known as "statements of live births" and return them to the division registrars who forward the statements to the central vital statistics office in Halifax.

It is interesting to follow a single statement of birth through the various stages of routine processing. When first received, a statement of a live birth is carefully checked for omissions and errors. Should such omissions or errors be noted, the statement is either returned to the division registrar who made

the return, or a letter of query is sent out to the division registrar or the informant. When returned to the central office properly completed or corrected, the statement is accepted.

Following acceptance, the statement of birth is given a ten digit non-duplicating number and an index card is made and filed in the appropriate alphabetic sequence so the record can be located at any future time. The statement is then passed to the statistical coding section where each item entered on the form is given an appropriate code number. These numbers are then punched on a punch-card. The statement is then recorded on microfilm. A completed film containing several thousand such records is forwarded to the Dominion Bureau of Statistics, Ottawa. The Dominion Bureau retains the negative film for use in preparing statistical tables and for the completion of a national index. A positive film is returned by the Dominion Bureau to the provincial office where it is retained. After processing, the record of the birth is placed in the appropriate record book or volume and stored in a fireproof vault.

Delayed Registration. There are many unrecorded births which occurred during the period of no official registration and many births that were not recorded even after official registration was in effect. The Vital Statistics Act makes provision for recording these births as delayed registrations. The provisions for filing a delayed registration of birth apply to any birth not recorded within a year from the date of the birth. The applicant is required to provide a completed application and affidavit in the prescribed form with the affidavit sworn by a parent or close relative or some person having knowledge of the facts of the birth. The application and affidavit must be supported by documentary evidence in the form of old records such as family bible records, church records, etc. The types of evidence considered acceptable are broken down into two classes, namely "A" class and "B" class. An item of evidence is considered to be Class "A" if it is a record made before the child became four years of age, and contains the name of the child, the date of birth, the place of birth, and the names of the parents. Church records of birth and baptism where the child was baptized in infancy, attending physicians' records or other forms usually are Class "A" evidence. Only one item of Class "A" evidence is required to support an application and affidavit for a delayed registration of birth. Almost any record not containing the qualifications for Class "A" evidence, but which nevertheless contains evidence of the facts of birth, might be accepted as Class "B" evidence. Not less than two items of such evidence are required to support an application and affidavit for a delayed registration of birth. Such items as census records, family records and others of this kind are included as Class "B" evidence.

The decision as to whether or not documents submitted are considered acceptable, and the class in which they are placed, rests with the registrar general, and is not subject to rulings or decisions of any other person or persons, nor of any court. Where the registrar general refuses to accept as sufficient the evidence submitted for a delayed registration of birth, or where the evidence submitted is conflicting, the persons may apply to a county court judge in the province, under section 7 of the Vital Statistics Act, for a court

order setting out the facts of the birth as accepted by the court. This same section of the Act further requires the registrar general to register the birth where a court order is made under the section. A certificate issued from a delayed registration filed under a court order may contain a notation setting out the basis for the registration.

Registration of stillbirths. Under the provision of the vital statistics act, a "stillbirth" is the birth of a foetus after at least twenty-eight weeks of pregnancy which, after complete separation from the mother, does not show any sign of life. The order of responsibility as set out for the registration of a live birth applies also to the registration of a stillbirth. The prescribed form is completed with the required personal particulars and passed to the undertaker who obtains from the attending physician the medical certificate of the cause of the stillbirth. The undertaker then files the fully completed statement with the division registrar who issues a burial permit.

Registration of deaths. The responsibility for registering each death lies with the undertaker who takes charge of the body. He is required to have the prescribed registration form completed with the personal particulars of the deceased, and the medical certificate of cause of death by the physician last in attendance. The fully completed registration form is filed by the undertaker with the division registrar who issues a burial permit. The clergyman who conducts the funeral service is required under the Act to insure that a burial permit has been obtained before he proceeds with the funeral service. Also, the cemetery caretaker is required to obtain the burial permit from the undertaker before allowing the body to be buried.

Registration of Marriages. The Solemnization of Marriage Act deals with the civil requirements for solemnization of marriages in the province. This Act provides for the registration of clergymen, and sets out the provisions for requirement of a marriage license or a permit for publication of banns prior to a marriage being solemnized. Deputy issuers of marriage licenses are appointed under this act in various parts of the province, for the purpose of issuing marriage licenses and permits for publication of banns.

An applicant for a marriage license or for a permit for publication of banns must be one of the parties to the intended marriage. Application in the form of an affidavit must be filed with the deputy issuer in either case. A license is not issued, except in special circumstances, until five days after the filing of the application, whereas a permit is issued immediately the application is filed. The marriage may be solemnized immediately after the license is issued, but where a permit for publication of banns is obtained, at least two Sundays must intervene between the date of issue of the permit and the date of the marriage. The banns must be published during at least one divine service on each of two consecutive Sundays between the date of issue of the permit and the date of marriage. Every clergyman who solemnizes a marriage in the province is required to file a statement of the marriage, in the prescribed form, with the deputy issuer who issued the license or permit, within two days after the date of the marriage. The deputy issuer is required to make his return of the statement of marriage to the central office, where the statement is processed and filed as a permanent record.

Other Registrations

Registration of Adoptions. Provision is made in the act for the adoption of children, whereby the court clerk, in the court where the adoption order is granted, is required to forward to the registrar general a certified copy of the order. Where the child adopted was born in Nova Scotia, the registrar must file the copy of the adoption order, and he must make a notation of the facts of adoption on the record of birth of the child. If the child was born outside the province, the registrar must file the copy of the adoption order and forward a certified copy of the order to the registrar in the province, state or country where the child was born.

Registration of divorces. Where a final decree for divorce is granted in the province, the clerk of the divorce court is required, under the vital statistics act, to file with the Registrar general, a certified copy of the final decree. If the marriage, made null and void by this decree, was performed in Nova Scotia, the registrar must make a notation of the divorce on the record of marriage, and he must file the copy of the decree. If the marriage was solemnized outside the province, the registrar must file the copy of the divorce decree, and must forward a certified copy of this to the registrar in the province, state, or country where the marriage was performed.

Change of name. For the purpose of vital records, the registrar can accept changes of name only where such changes have been made by or under the provisions of an act of the legislature of the province, or of any other province, state or country. Changes of name by adoption, by special act of the legislature, and by means of the change of name act are the accepted methods in the province. It should be noted that the filing of a change of name by deed poll with the registrar of deeds, is accepted by certain authorities where the change refers to matters pertaining to property transactions. A change of name of this kind does not come under the provisions of an act of the legislature, and cannot therefore be accepted by the registrar general for vital record purposes.

Interdepartmental Services

In registering births a form is prepared giving the name of the child, the date and place of birth and the parents' name and address. This form is forwarded to the medical officer in charge of the health district for use by the public health nurses.

Lists of the names and addresses of persons seventy years of age and over, who die in the province, are supplied to the old age security authorities to clear their files, and similar lists of persons dying between the ages of sixty-five and sixty-nine years are supplied to old age assistance authorities for the same purpose. Lists of the children dying under the age of sixteen years are supplied to the family allowance authorities.

Summary

The story of the early efforts to provide registration of vital statistics in Nova Scotia is outlined and the present legislation reviewed. The steps in the registration of births, deaths and marriages are traced as well as the measures taken to assure accuracy and permanency of the records.

Canadian Journal of Public Health

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THE FORTY-SIXTH ANNUAL MEETING

THE forthcoming public health congress will join with other groups in marking the tenth anniversary of the World Health Organization. The Association will be privileged to have Dr. M. G. Candau, Director General, as the speaker at a special session to commemorate this notable organization. Dr. Candau's attendance at the meeting will precede the Tenth Anniversary Commemorative Session of the World Health Organization to be held in Minneapolis, Minnesota, on May 26 and 27. This will be followed by the Eleventh World Health Assembly extending over the succeeding three weeks. Representatives from most of the eighty-four member nations and four associate members will be in attendance.

It is the privilege of the Association to be host to the Western Branch of the American Public Health Association this year. The Western Branch has a high reputation for its meetings, its accomplishments in public health and its fellowship. The joint program will be an outstanding one.

The joint meeting will be favoured also by the State and Provincial Health Authorities of America who will hold their annual Conference immediately preceding the general meetings. This is a unique body and its history goes back to 1884 when, under the leadership of Dr. C. N. Hewitt, Health Officer of Minnesota, state and provincial health officers from thirteen states and from Canada met in St. Louis, Missouri and formed the association. It is of interest that Ontario was one of the charter members, being represented by Dr. Charles W. Covernton and Dr. Peter H. Bryce, officers of the provincial board of health. For more than thirty years, the late Dr. A. J. Chesley, Executive Officer of the Minnesota State Department of Health, was the untiring secretary of the organization. Writing of this association, Dr. W. G. Smillie said: "This Conference, which has remained in continuous existence since its formation, has always been an unobtrusive and simple organization; nevertheless, it became the most effective single cohesive force in the promotion of public health throughout the nation" (1).

Vancouver, our host city, will be in festive array to mark the centenary of the province of British Columbia and will extend a welcome to be long remembered by all who attend the public health congress.

(1) Smillie, W. G.: Public Health: Its Promise for the Future.

THE EXECUTIVE COUNCIL OF THE CANADIAN PUBLIC HEALTH ASSOCIATION

HOW are the policies of the Association determined and its programs planned? The founders of the Association, by Act of Parliament in 1912 establishing the Association, assured that these matters would be placed directly in the hands of the membership. The Executive Council, which is named by the membership at the annual meeting of the Association, was given full responsibility for the carrying out of the objectives of the Association set forth in the charter. With broad vision, the founders stated that the Association was established for "the development and diffusion throughout Canada of the knowledge of sanitation in all its branches". Today, the word "sanitation" relates to only a segment of the health field but when the charter was written the term "sanitation" was synonymous with health.

The Executive Council is thoroughly representative of the membership and consists of the officers, the past presidents, the chairmen of the sections of the Association and two representatives from each of the ten provinces. The latter now include the representatives of the provincial associations, branches, or divisions. The Council is in session during the annual meeting. This body and this body alone formulates the policies and programs of the Association. In the interval between meetings, the Council delegates its authority to the Executive Committee, thus permitting effective administration of the Association's affairs.

The Council will hold three sessions at the annual meeting, commencing on the day previous to the opening of the general program. Of special importance at this year's Council meeting will be the presentation by the committee set up under the chairmanship of Dr. Kenneth Charron to study the aims and needs of the Association. A start has been made in long-range planning for the Association's future and this will be an interim report on planning its present and future work. The Council will also receive reports from ten important committees and from the various sections of the Association. The work of the Association during the past year is reviewed by the Honorary Secretary and the audited financial statement presented by the Honorary Treasurer. Other reports include those of the editorial board, and the committees on social security, professional education, membership, certification of sanitary inspectors, honorary life membership and recruitment.

The Association is handicapped by its limited financial resources. At no time is this more clearly evident than at the sessions of the Executive Council where it becomes apparent that planning of greatly needed programs cannot be undertaken because of lack of funds. The provincial associations, branches and divisions are similarly handicapped. It is hoped that Dr. Charron's committee will continue consideration of the problems and in due course present recommendations for the consideration of the Executive Council which may make possible needed extensions of the work of the Association to strengthen further the public health movement in Canada.

Your attendance at the forthcoming annual meeting in Vancouver from May 20 to 22 will be evidence of your participation in the work of the Association and your interest will mean added strength.

Training of Foodhandlers[1]

F. GRAHAM,[2] C.S.I.(C)

THE City of Halifax has for some years attempted to bring information on foodhandling techniques to the operators and employees of restaurants and institutions. At these sessions films are usually shown on various methods of good and bad practice in foodhandling. While such films are invaluable they should be supplemented by lectures on specific subjects, demonstrations and exhibits.

Any course of instruction should be under the direction of the local health department since the department is charged with inspection and control of eating places. Outside agencies should be called in to take active part in establishing the course and lectures and demonstrations. Local boards of trade, chambers of commerce or other service organizations are interested because they are concerned with measures that will improve business in their communities. Manufacturers of food service equipment, chemicals, and food products are always pleased to take part in the program and provide demonstrations. Advertising, of course, should be kept out of any course.

The medical officer of health and public health nurse should have a major part in the instruction. Practising physicians, restaurant association representatives (C.R.A.), and laboratory directors are often willing to assist. The use of radio, television and the press will help make the course known.

There are some essential considerations in preparing the course. The program should be interesting and varied and the lectures informative but not too long. Films and practical demonstrations should be spaced between discussions. Time should be allowed for question periods. Keep your class comfortable. It is difficult to maintain the interest and attention of a class in a poorly ventilated, overheated room. Start on time and finish on time.

As an example of a program which I feel covers most of the basic items of good foodhandling practice, I will outline the program of the course presented in Halifax this year. Prior to the course the owners, managers, heads of institutions, etc., were invited to a preview where the entire course was presented. This audience was asked to make suggestions that would help us to improve the course or make any changes that would better adapt it to local conditions. The preview also had the effect of making us all better acquainted and gave the restaurant owners a different idea of the function of the health department. The course was of two hours' duration and was divided into two sessions of one hour each.

Foodhandlers' Training Course—Program

First Session: Introduction: Dr. Morton, Commissioner of Health; Film: The housefly; Lecture: Personal

[1]Presented at the sixth annual meeting of the Atlantic Branch, Canadian Public Health Association, Kentville, N.S., Nov. 7, 1956.

[2]Chief Sanitary Inspector, City of Halifax, N.S.

hygiene; Lecture: Foodhandling, F. Graham; Film; Hashslinging to foodhandling; *Second Session*: Lecture: Food storage and food poisoning; Film: The best food in town; Lecture: Dishwashing and Sterilizing, Mr. G. L. Murray, District Manager, Diversey Corp.; Lecture: Housekeeping in a restaurant, Mr. E. B. Edwards, President, Maritimes Branch, C.R.A.

A summary was given by Mr. F. Graham followed by a "true or false" test and the distribution of an evaluation sheet containing ten questions which could be answered by checking "yes" or "no". On this sheet an opinion of the value of the course was requested. Some of the opinions most commonly expressed were as follows: the course was interesting and very worthwhile; it should have been longer with more time devoted to certain subjects; some thought should be given to the possibility of extending the course and having evening sessions; the course could be improved by having demonstrations of actual foodhandling techniques.

Materials used in the course included films, pamphlets, mimeographed instruction sheets, restaurant equipment, dishes, cutlery, washing baskets, etc., petrie dishes showing bacterial growth under varying conditions, examination sheets and evaluation sheets. Mimeographed instruction sheets were also printed in Chinese. These proved very popular with Chinese operators.

A pocket-size card certificate was issued to all who attended the whole course. A certificate suitable for framing and public display was given to all establishments with 100% of their staff in attendance. I have found that these items help to create interest in the course. One owner, with a chain of several restaurants, closed his premises for two afternoons to allow his staff to attend.

In regard to attendance, it is my personal opinion that foodhandler training should be compulsory and that certificates should be kept up to date.

Many of our food poisoning outbreaks are the result of improper foodhandling practices at functions sponsored by local organizations. These are usually voluntary efforts carried out by the ladies of the organization. I feel that it is our responsibility to set up instructional classes in our communities to instruct such groups in proper techniques of storing, handling and serving food.

NATIONAL MEMBERSHIP ENROLMENT
C.P.H.A.

During 1958, the provincial branches and provincial associations are presenting the claims of membership to all public health workers in Canada.

DO YOUR PART BY ENROLLING A NEW MEMBER

NEWS NOTES

International

An new periodical entitled the *International Journal of Health Education* is now being published in Switzerland. It is planned to present quarterly French and English editions and the aim of the periodical is to facilitate exchange of experiences, ideas and news concerning health education and to bring useful information to health workers and health education specialists. The first issue (January 1958) carries messages from Professor Jacques Parisot and from Dr. M. G. Candau, Director General of WHO. This new publication is the official organ of the International Union for Health Education of the Public.

Federal

J. W. T. Spinks, M.B.E., Ph.D., F.R.S.C., head of the department of chemistry, University of Saskatchewan, and J. T. Wilson, O.B.E., Ph.D., F.R.S.C., professor of physics, University of Toronto, have been appointed as new members of the National Research Council of Canada for three years from April 1. Retiring members are T. Thorvaldson, Ph.D., LL.D., F.R.S.C., dean of graduate studies emeritus, University of Saskatchewan, and W. H. Watson, Ph.D., F.R.S.C., professor and head of the department of physics, University of Toronto.

Bruce Smyth, who has been engaged in postdoctorate studies under a research fellowship at Perdue University, Lafayette, Indiana, U.S.A., has re-joined the food colour section, food and drug directorate, Department of National Health and Welfare. Mr. Smyth was a member of the food and drug staff from 1949 to 1951 prior to taking postgraduate work at Queen's University and New York University.

Under the direction of Dr. W. A. Prowse, D.P.H., chief, civil aviation medicine division, Department of National Health and Welfare, a week's training course was held at the R.C.A.F. Institute of Aviation Medicine, Toronto, in mid-March to discuss problems arising from the rapid expansion of air travel and the increasing use of turbo-prop and jet-engined aircraft. The course was attended by medical examiners of the Department of Transport and the six regional medical officers of the civil aviation medicine division.

David B. Tonks, Ph.D., chemist, clinical laboratory section of the Laboratory of Hygiene, retired at the end of February to accept an appointment at the Hospital for Sick Children, Toronto.

A bill which would have permitted the City of Ottawa to fluoridate its water supply was rejected by the private bills committee of the Ontario Legislature during the 1958 session.

Dr. R. B. Jenkins, D.P.H., medical officer-in-charge of the quarantine, immigration medical and sick mariners' service, Department of National Health and Welfare, at William Head, B.C., retired from the federal service on March 31. Acting officer-in-charge at William Head is Dr. J. J. Collins, D.P.H., D.I.H.

D. W. Stainer, Ph.D., a graduate of the University of Liverpool and holder of an N.R.C. postdoctorate fellowship, has joined the vitamin section of the food and drug laboratories, Department of National Health and Welfare.

The Department of National Health and Welfare's mental health division has recently released the fourth memorandum in its report series. Entitled "The Social Worker—Rehabilitation and the Mental Patient", it was prepared by Miss Jean Dorgan, M.S.W., the mental health division's consultant in social work.

A. V. Raison, B.A., editor of the *Occupational Health Review* and other publications of the occupational health division, Department of National Health and Welfare, has resigned to accept a position as associate editor of the Roads and Engineering Journal Toronto.

N. C. Nair, who is in charge of drug control in the state of Kerala, India, and is in Canada under the Colombo plan, is working in the pharmaceutical chemistry section of the food and drug laboratories, Department of National Health and Welfare.

Hospital construction grants recently approved under the National Health Program include: *Quebec*—Hôtel Dieu de St. Joseph nurses' residence, St. Jerome (Terrebonne), $67,400; *Ontario*—Ontario Hospital nurses' residence, Smiths Falls, $77,500; *Saskatchewan*—Govan Health Centre, $2,350; *Alberta*—Lloydminster Hospital nurses' residence, $12,000; Eastcroft Health Clinic, Edmonton, $9,217; *British Columbia* — Summerland

Health Centre, West Summerland, $11,516; Pemberton Health Centre, $2,410.

During February, Indian and northern health services, Department of National Health and Welfare, held a week-long conference attended by senior officers from its regional offices to review and evaluate current programs and to consider future activities. The Public Health Engineering Division also held a three-day staff conference in March at which a representative from each of the division's eight districts presented a technical paper on work carried out during the past year or on work planned for the future.

Miss Mildred I. Walker, M.A., senior nursing consultant, occupational health division, Department of National Health and Welfare, attended the meeting of the committee on education of the American Association of Industrial Nurses in New York City and the President's Conference on Occupational Safety in Washington, D.C., in March.

A study to measure the level of air pollution in the Sudbury, Ont., area got under way early in 1958 under the direction of Dr. C. M. Jephcott, director of air pollution, Ontario Department of Health. The information to be obtained will be used not only for assessing the local problem but will also be valuable in making comparisons with air pollution levels in other Ontario cities. The study is being carried out in close co-operation with the Ontario Department of Mines and the consultant on air pollution of the Department of National Health and Welfare and is being partially supported by a national health grant.

Until the outbreak of the second World War, there was only one medical service for our armed services, the R.C.A.M.C. Early during the second World War the R.C.N. and the R.C.A.F. established their own medical services. During the last few years serious attempts have been made to exercise greater economy in the utilization of medical manpower by the armed forces. This effort has recently culminated in the setting up of a Joint Services Medical Board with a permanent chairman—the Director General Joint Medical Services (D.G.J.M.S.). Other members are the Directors General of the Navy, Army and Air Force. The tri-service hospitals which will commence in 1958, will be known as the Department of National Defence Hospitals and will be located in Halifax, Ottawa and Kingston. Each hospital will be responsible on a regional basis for the provision of adequate care for all three armed forces and each will be affiliated with the medical faculties of the local university.

A full public health service for all persons in the Yukon has been announced by the Department of National Health and Welfare. The new service will be operated by the Indian and Northern Health Service of the Department in co-operation with the Territorial Government, the cost being shared.

Dr. N. D. C. MacKinnon, D.P.H., formerly officer commanding the Whitehorse Military Hospital, has been appointed chief medical health officer of the Yukon Territory and superintendent of the Yukon zone of the Foothills region, Indian and Northern Health Services, Department of National Health and Welfare. Four public health nurses have been appointed to work with Dr. MacKinnon: Mrs. Winnifred H. Shandro and Misses Glenna O. Robinson, Elizabeth W. Sime and Jean MacDonald. In the planning for some time, the service is aimed at providing for every Yukon family a gradually increasing level of public health care, with the advice and co-operation of family physicians. The costs are being shared by the Territorial Government and the Department of National Health and Welfare.

Herbert Dorken, Ph.D., consultant in psychology, mental health division, Department of National Health and Welfare, was elected a director of the Ontario Psychological Association at the annual meeting in London, Ont., early in February.

Dr. K. F. Wells, Veterinary Director General, has reported on the progress in the eradication of bovine tuberculosis. Under the Restricted Area Plan 1,489,922 tests were conducted and 2,885 reactors were found. During the past year, tuberculin testing of Manitoba's cattle was completed. With the exception of Newfoundland, all cattle east of the Saskatchewan—Manitoba boundary have been submitted to tuberculin tests at least once and 88.6% of all cattle in Canada have been tested. An accredited area is one in which the infection rate is 0.5% or less, and there are now 397 such areas in Canada, some in each province. There are 453,376 of Canada's estimated 10,254,000 cattle in these accredited areas. In last year's testing the infection rate proved to be 0.16%.

A collaborative study "An Evaluation of Treatment—the Brandon Hospital for Mental Diseases" by Stuart Schultz, M.D., and A. L. Henderson of that hospital, E. E. Clarke of the federal Insurance Department and J. W. Fisher, Ph.D., consultant in research and statistics, mental health division, Department of National Health and Welfare, has just been released as memorandum No. 3 in the mental health division's report series.

Dr. L. B. Pett, chief, nutrition division, Department of National Health and Welfare, recently visited several centres in western Canada in connection with existing or projected nutrition studies and other nutritional matters. While in British Columbia he addressed a meeting of the British Columbia Dietetic Association.

A permanent child and maternal health advisory committee has been authorized by an order-in-council passed January 13, 1958. The committee will assist the child and maternal health division, Department of National Health and Welfare, in the planning and implementation of its program.

School of Hygiene, University of Toronto

Dean M. St. A. Woodside, Acting President, University of Toronto, has announced that the University will offer a new course to train bacteriologists for the health services commencing on September 12, 1958. This course is made possible by the receipt of a federal health grant allocated to the province of Ontario. The course, which will prepare university graduates for the Diploma in Bacteriology of the University of Toronto, will be given in the School of Hygiene, and will be under the direction of Dr. A. J. Rhodes. The course will be of about nine months' duration and will consist of lectures, seminars, and laboratory exercises in systematic bacteriology, systematic virology, public health bacteriology, medical mycology, medical parasitology, and statistical methods. There is at present a serious shortage of trained bacteriologists in public health, hospital, university and veterinary laboratories. It is hoped that the provision of this academic course will help to alleviate this present shortage in Ontario and elsewhere.

Saskatchewan

Dr. Alexander Robertson has been appointed to the Chair in Social and Preventive Medicine at the University of Saskatchewan. Dr. Robertson graduated from the University of Edinburgh and received his Diploma in Public Health from the London School of Hygiene and Tropical Medicine. He was formerly in charge of the Teaching School of Social and Preventive Medicine at the Royal Free Hospital. Dr. Robertson is particularly interested in the training and the role of auxiliary workers in medicine and in the combining of the preventive and curative aspects of medical practice.

Ontario

Adults in Ontario are now being offered the opportunity to receive a tuberculin test without charge. The test will be given in conjunction with the regular Ontario Department of Health X-ray surveys and the program was started on a limited basis during the April chest survey of Northumberland County residents.

New Brunswick

Dr. J. A. Melanson, Chief Medical Officer, has returned to his office following recovery from injuries sustained when his car was struck at a Fredericton intersection.

Dr. M. Southern-Holt, Director of Maternal and Child Health, attended a meeting in Ottawa called by Dr. Jean Webb, Chief of the Child and Maternal Health Division, for the purpose of considering the formation of a national advisory committee on maternal and child health.

Nursing directors in New Brunswick hospitals attended a conference and workshop in Moncton from May 7 to 12 held in the new nurses' residence of the city hospital. This course was arranged by the N.B. Registered Nurses' Association and is a further implementation of the Russell Report on Nursing Education in New Brunswick.

The New Brunswick Branch of the Canadian Society of Laboratory Technologists will present a laboratory display in Saint John on May 24 and 25. Various tests performed by laboratory technicians will be illustrated. The purpose of the display is to recruit laboratory technicians and to help the public understand the important role of hospital laboratories.

Coming Events

Canadian Conference on Social Work, June 1–6, Montreal, Que.

Canadian Medical Association, June 15–19, Halifax, N.S.

Canadian Tuberculosis Association, Chateau Frontenac, Quebec City, June 9–12.

Ontario Public Health Association, Toronto, September 29–October 1, 1958.

Canadian Otolaryngological Society (Société Canadienne D'Otolaryngologie) – Annual Meeting–Halifax, N.S. (Dr. Donald M. MacRae, 324 Spring Garden Road, Halifax, N.S.), June 9–11, 1958.

Canadian Federation of Biological Societies, First Annual Meeting, Queen's University, Kingston, Ontario, June 9–11.

Books and Reports

A MENTAL HEALTH HANDBOOK. Ian Skottowe, M.D., M.R.C.P., D.P.M., Edward Arnold Limited, London, England, McAinsh, Toronto. 1957, 196 pp. $3.60.

Dr. Skottowe is a psychiatrist at the Warnerford and Park Hospitals, Oxford. Mental health services are expanding rapidly in Great Britain as elsewhere. This book is written primarily "for doctors, social workers, health visitors and others in public health departments and for other persons, medical and lay, whose work brings them into contact with mental health from time to time." It presents the trends in the development of mental health services and outlines the present knowledge of mental health and mental illness with special attention to social factors. It suggests ways in which individuals and authorities in various localities may set about establishing or expanding an efficient day-to-day service. The chapters include: An introduction to mental health services; What is mental health?; Personality and constitution; Natural experience and social culture; The varieties of mental ill-health; Some social repercussions and opportunities; Towards prevention and treatment; Organization, training and research. This book will be welcomed in Canada and will find a place in health departments and in hospital libraries.

THE VOLUNTEERS. Means and Ends in a National Organization. David L. Sills, Ph.D. The Free Press, Glencoe, Illinois. 1957, 320 pp. $6.00.

The National Foundation for Infantile Paralysis is the most successful and most widely publicized voluntary health association in the United States. It was, therefore, the most suitable organization to study the contribution of voluntary workers since such a large number of persons have made the organization possible. *The Volunteers* is the first intensive examination of what it means to be a volunteer worker. The book is concerned chiefly with the local organizations of the Foundation and their volunteer members. The Bureau of Applied Social Research of Columbia University and the American Institute of Public Opinion of Princeton, New Jersey were provided with an opportunity to undertake a series of studies of the Foundation's local programs. The author served as project director for the Bureau of Studies. The findings of the study constitute knowledge which can be applied to the great amount of work yet to be done by volunteers in the fields of mental health, cancer and other public health problems. This volume will repay careful study by all who are interested in voluntary health agencies, their work and their future.

HOST-PARASITE RELATIONSHIPS IN LIVING CELLS. A Symposium sponsored by the James W. McLaughlin Fellowship Program, University of Texas. Compiled and edited by Harriet M. Felton, M.D. Charles C. Thomas, Publisher, Springfield, Illinois. Published simultaneously in Canada by the Ryerson Press, Toronto. 1957 245 pp. $7.25.

This volume presents the papers of the first symposium honouring the memory of James W. McLaughlin, professor of medicine, University of Texas, from 1897 to 1905. The symposium was held on April 27, 1957. The participants were Drs. Edward W. Dempsey, Rene J. Dubos, R. Dulbecco, Carl E. Georgi, Robert A. Good, John H. Hanks, Stuart Mudd.

The symposium dealt with materials and methods employed in current investigations of tissue and cell physiology. This presentation is carefully edited and condensed with an abstract of the discussions. In keeping with the high standards of the publisher, Charles C. Thomas, the book is a masterpiece of good printing; the illustrations are particularly fine, several pages being in colour. The list of references is most comprehensive. Dr. Felton is to be congratulated for her work in compiling and editing, thus extending the privileges of the symposium to all who are interested in this highly important field of study.

THE INCURABLE WOUND AND FURTHER NARRATIVES OF MEDICAL DETECTION. Berton Roueché. Little, Brown & Co., Boston, Mass. 1957, 177 pp. $3.50.

Through his narratives of medical detection published in the *New Yorker* Berton Roueché became known for his good detective stories in the field of medicine. His first collection ELEVEN BLUE MEN revealed his ability as a layman to write about medical subjects with scientific accuracy, creating at the same time the fascination of the detective story. The volume includes six short stories—The Incurable Wound; Lost; One of the Lucky Ones; $CH_3CO_2C_6H_4CO_2H$ (Aspirin); The Most Delicate Thing in the World; and, Ten Feet Tall. Public health personnel will particularly appreciate these clever presentations of some of the most perplexing medical subjects.